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The Refrigeration Service Engineer

VOL. 12 NO. 4

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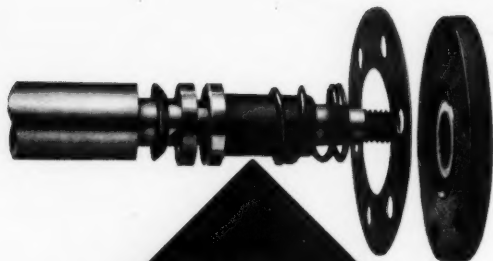
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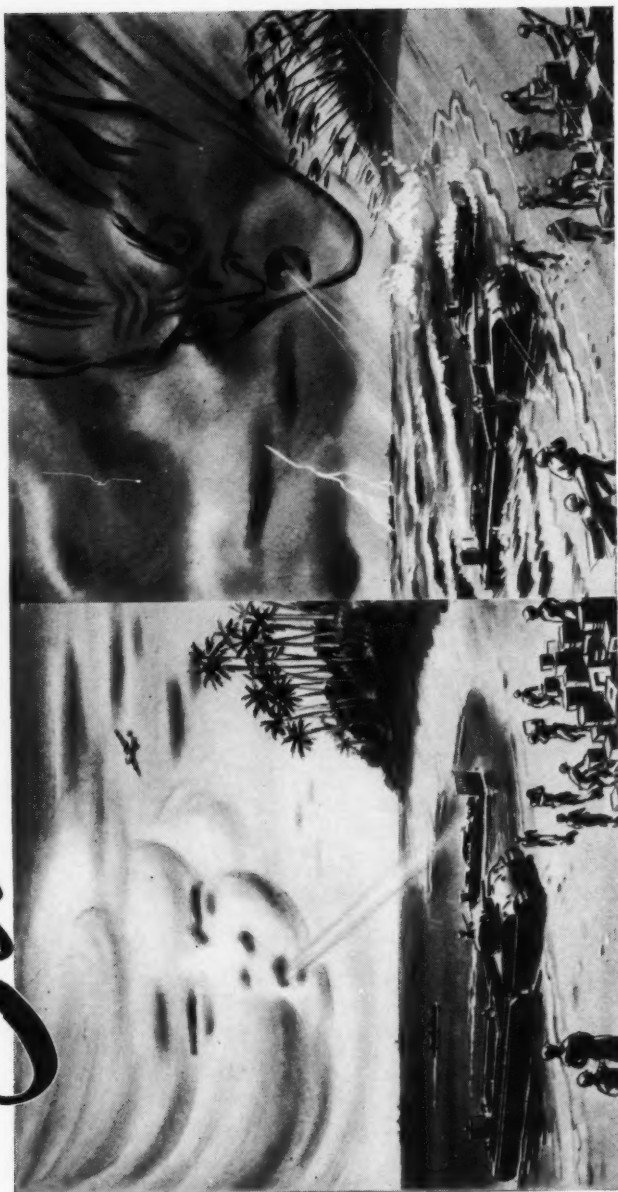
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April, 1944

2

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Probable Cause—Test and Remedy

Fuses blown. Check fuse capacity, they should not be greater in ampere capacity than recommended by appliance manufacturer; in no case smaller than full-load ampere rating of motor, and a voltage capacity equal to or greater than voltage of supply circuit.

Open-circuited field or armature. Indicated by excessive sparking in starting, or refusal to start at certain positions of rotor, or by humming sound when switch is closed. Examine for broken wires, loose connections or burned segments in commutator at point of loose or broken connection. Inspect commutator for foreign metallic substance which might cause short between commutator segments.

Worn brushes or sticking brushes. When brushes are not making proper contact with commutator, the motor will be weak in starting torque. This can be caused by brushes worn, brushes sticking in the holders, brush springs weak, or commutator dirty. Commutator should be polished with fine sand-paper (never use emery). Commutator should never be oiled or greased.

Improper brush setting. Unless a new armature has been installed the brush-holder or rocker arm indicated should be opposite index and locked in position. If new armature has been installed the position may be slightly off original marking.

Improper line connection. See that connections are exactly like connection diagram which is sent with motor. Motor may through error be wired for higher voltage and connected to lower voltage supply.

Shorted rotor. Remove brushes from commutator and impress full voltage on stator. If there are one or more points at which rotor "hangs" or fails to revolve easily when turned, the rotor is shorted. By forcing rotor to the position where it is most difficult to hold, short can be located as the shorted coil will become hot. Do not hold in position too long or coil will burn out.



Your job is to secure more efficient performance and longer life from the refrigeration units you are called upon to service. Your Brunner Manual can help you. If you don't have a copy, we'll be glad to furnish one for \$2.50. Write to:

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SERVICE NEWS

WAR-TIME NEWS LETTER

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Remember that Methyl Chloride per unit of volume weighs less than most refrigerants ... that 7 lbs. of Methyl has about the same volume as 10 lbs. of "Freon" 12.

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Speed up the compressor - 5 to 10% - if equipment construction will permit. This is necessary to handle the increased volume of vapor. Power consumption won't be greater even with the speed-up because required HP/ton of refrigeration is slightly less with Methyl Chloride than with "Freon" 12 or sulfur dioxide.

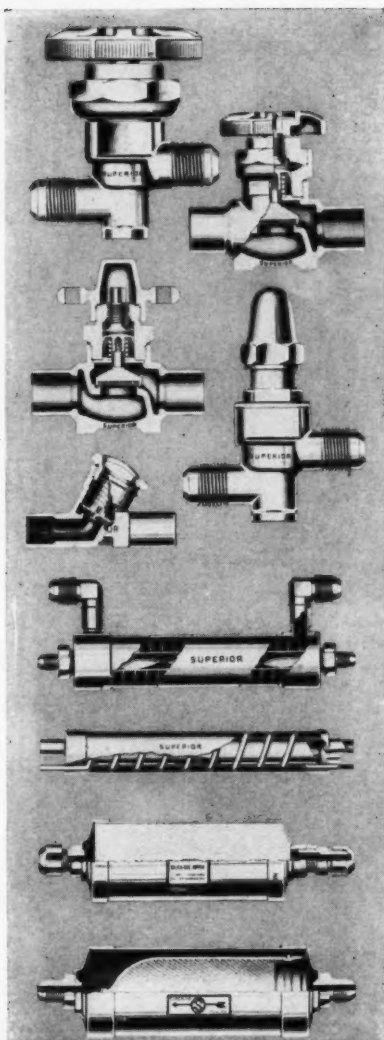
Check every replacement job to be sure that it conforms with American Standard Association Safety Code.

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THOMAS COYLE
Manager, Chloride Products Division

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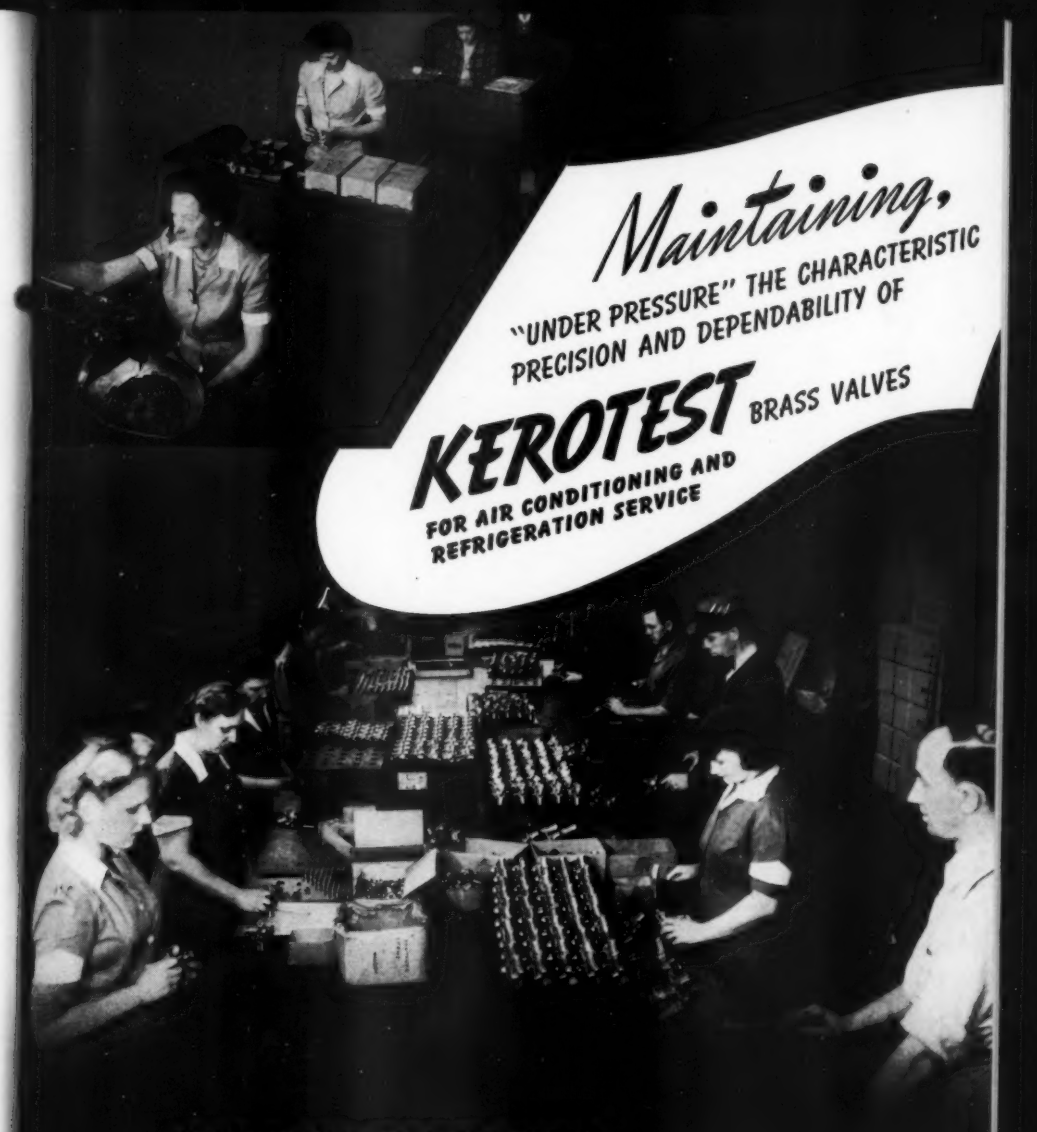
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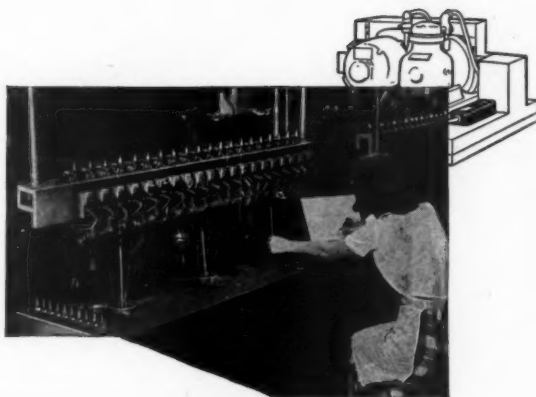
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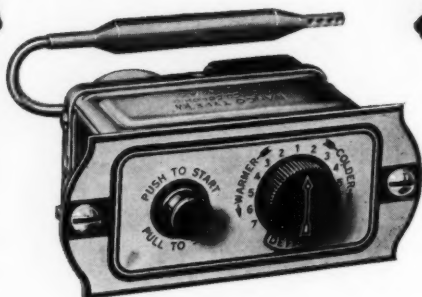
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The Refrigeration Service Engineer

Vol. 12

No. 4

April, 1944

A Monthly Illustrated Journal Devoted to the Interests of the Refrigeration Service Engineer in the Servicing of Domestic and Small Commercial Refrigeration Systems and Oil Burners

Official Organ
REFRIGERATION SERVICE
ENGINEERS SOCIETY

The Cover

There will be a big demand for home freezer cabinets after the war. This picture shows such a cabinet in the home of a Wisconsin farm housewife. See article in March issue.

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SERVICE ENGINEER

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A name to remember...



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The Refrigeration Service Engineer

Vol. 12, No. 4

CHICAGO, APRIL, 1944

\$2.00 Per Annum

The Practical Side of Sub-Zero Refrigeration

By W. J. Aulsebrook*

IN choosing the title for this article, I deliberately used the word "practical" to focus attention on the fact that a great deal of talk going the rounds, and a great deal of advertising and promotional activity, is laying stress on scientific developments that are far from practical. Some misguided feature writers and even the promotional departments of some of our largest manufacturers are painting pretty pictures of revolutionary postwar developments that belong in the Superman and Buck Rogers strips, but which have no place in the thinking of engineers and business men.

We must look at the practical side of this problem and weigh it in the same scales that we have used on other problems in the past. We must not be deluded by the spectacular, or led to waste our time developing circus horses when the real need is for Percherons to pull a heavy load.

With that thought as an introduction, I am going to sketch briefly a number of developments with which I have become familiar during the past few years, give you some basic facts that have been established, and then suggest how we may translate part of these to practical future uses.

* Assistant sales manager Servel Inc., ER & AC Division, Evansville, Indiana.

Prior to the war, there was very little commercial or industrial refrigeration requiring temperatures below minus twenty degrees, except the comparatively large processing installations used by quick freeze plants and certain of the larger ice cream manufacturers where temperatures in the neighborhood of minus sixty degrees were employed for specialized purposes. On these, ammonia was usually the refrigerant, and it is probable that it will be used widely for such purposes after the war. It is comparatively cheap, normally plentiful, and there are many engineers and mechanics who are familiar with it and who can be depended upon to do an efficient job with it.

There are many of you here who could present that phase of the story better than I can, and so I will confine my remarks to the newer and less familiar problems in the use of so-called "Chlorinated Hydrocarbons" such as Freon-12 and Freon-22. These refrigerants have found a place in the low temperature field for the same reason they have become popular in other applications—that is, because they are suitable for small machines, are comparatively safe and easy to handle and may be used with a wide variety of metals in the system.

Soon after our defense production program got under way late in 1940, my company began to get scattered inquiries for temperatures in the neighborhood of minus sixty degrees Fahrenheit. At first these were for one or two units in a place and while the market showed no prospect for volume sales, the projects were extremely important and so we started our engineering department on a program to develop something to meet this demand. By the fall of 1941, we had a couple of small jobs that would operate satisfactorily at evaporator temperatures of minus seventy degrees, using Freon-12, and they were set up so that they showed reasonable prospects of "staying put" over a period of time.

In order that we may all be thinking along the same line, and to clarify the nature of this problem, I will run over some charts which will refresh everyone's memory on certain basic facts before we get into the more complex part of the story. For the time being, I will speak only of Freon-12 and later make a comparison with certain other refrigerants.

Here is a chart Fig. 1 showing the theoretical displacement of a compressor to develop one ton of capacity at various suction temperatures with a constant condensing temperature of 100°. This curve is an approximation and would certainly not be good

enough to serve as a basis for serious designing, but it is probably right into five or ten per cent and so will serve for purposes of illustration.

You will observe that even if we build a compressor with a 100% volumetric efficiency, we run into some really substantial displacement when we go down to minus eighty, ninety or one hundred degrees. At one hundred twenty below we need a displacement of at least two hundred fifty cubic feet per minute; at one hundred below, about one hundred fifteen feet; at eighty below, about fifty-seven feet, and so on. In order that we may more easily visualize this, I have marked on the curve the stroke and bore of a four-cylinder compressor operating at 1000 RPM to give these approximate displacements. At one hundred twenty below it takes a 5" x 5" compressor, at one hundred below a 4" x 4", at eighty a 3½" x 3½", at 60 below a 2½" x 2½", etc. Note that these compare with a 1¼" x 1¼" at twenty above zero. These are all set up to deliver 12,000 BTU per hour and assume no losses at all. Looking at it another way, we can say that this compressor which delivers one ton at minus 120° is about the same size we would use on a 75 ton air conditioning unit. If you need more or less capacity, the size would, of course, go up or down in proportion.

From a practical standpoint also, we should bear in mind that we can't build a compressor having a 100% volumetric efficiency. Seventy-five or eighty per cent is pretty good at these higher back pressures and the efficiency of a single stage unit falls off rather rapidly below minus twenty degrees. This is, of course, a direct function of the compression ratio.

At 20 above zero, we have a ratio of about 3½ to 1—that is 36 pounds absolute to 180 pounds absolute; at zero the ratio is 24 to 180, or about 5½ to 1; at twenty below it is 15 to 180, or about 8½ to 1, and so on until we get down to minus 120 degrees where we have a suction pressure of .65 lb. against a head of 180 lbs., which gives us a ratio of over 200 to 1.

It is possible to build a reciprocating compressor having a fairly good efficiency at a compression ratio of 20 to 1, which with Freon-12 would take us down to about minus 50 degrees F., but it is not practical to build that kind of a compressor on a production line. The limits would have to be held extremely close, assembly would have to be on a selective basis.

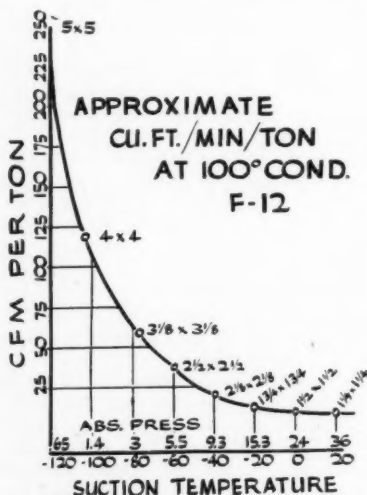


Fig. 1—Chart showing Theoretical Displacement of Compressor

With a lot of hand work, and even though we could produce such a compressor at a substantial increase in cost, we would have no assurance that it would "stay put" for any length of time after being put in service. A little flake of foreign matter under a valve, a little bearing wear that increases the clearance volume, and suddenly the efficiency drops back to that of a standard compressor. The real practical limits of compression ratio, therefore, drop back to those we have proved practical in the past. We all know that any good commercial compressor will give acceptable efficiency at zero, at which point our saturation pressure is 24 pounds absolute and the compression ratio is about $5\frac{1}{2}$ to 1. If we are a little more careful of clearance volume, piston fit, valve construction, etc., we can do a pretty fair job at minus twenty, where our ratio is $8\frac{1}{2}$ to 1.

Two Stage Compression

For lower temperatures, therefore, the sensible thing to do is to break the compression into two stages, so that each stage will operate at fairly high efficiency. To get minus 50° in the evaporator, where our ratio is about 20 to 1, we can have two stages working at about $4\frac{1}{2}$ to 1. If we drop to minus 75° our overall ratio will be about thirty-six to one and our ratio per stage six to one.

By this procedure we do not escape the necessity for providing the relatively high displacement required in the first stage, for you will remember I mentioned that this chart presumes approximately 100% of volumetric efficiency, and we can't get that by any method. We can, however, get from 70% to 80% efficiency from such an assembly. This sketch indicates diagrammatically about how this plan works out and I have shown a four-cylinder compressor in the first stage and a single cylinder in the second stage.

Another point worthy of note at this time is the fact that at extreme low temperatures the flash gas generated at the expansion valve by virtue of the heat in the 100° liquid, amounts to about one-third of the total volume handled by the first stage compressor. If we can sub-cool this liquid by external means, we reduce our displacement accordingly. Of course, if we want to cool it all the way down by using a separate refrigerating system, we don't gain anything but simply split our displacement up between two units. We can, however, pick up

about three-quarters of the load by cooling the liquid to the vapor pressure of the second stage.

I had a sticker over this subcooler to avoid confusion, but now you can see what I am talking about. This is a typical heat exchanger through which the warm liquid passes on the way from the receiver to the main evaporator. The liquid splits off here and a portion is passed through an expansion valve, evaporated to cool the liquid, and the resultant vapor fed into the second stage. If carefully designed, a cooler of this type will drop the liquid very close to the vapor pressure of the second stage. It saves about 25% of the displacement in the first stage and also improves the quality of the gas delivered to the second stage. This is important because the second stage of this type of system has a tendency to run pretty hot.

Now we have diverted about 25% of our low pressure vapor around the first stage and if we're getting 75% efficiency, that just about gets us back to par so that this theoretical 48 CFM is pretty close to the actual. In practice we have found it advisable to favor the first stage by using about $33\frac{1}{3}\%$ of the total displacement in the second stage.

It is practical to use two compressors driven by separate motors, or as has been done by our company and others, the two stages can be built into one compressor if it has four

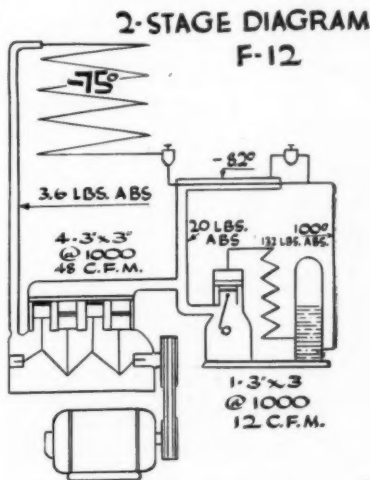


Fig. 2—Two-stage layout

or eight cylinders. This makes the job more compact and field service is somewhat simplified.

A two-stage layout of this type illustrated in Fig. 2. has proved practical for temperatures down to minus 75 degrees F., using Freon-12, and there are many hundreds of them running on hot and cold test cabinets, stratosphere chambers, metal aging units and blood plasma apparatus all over the country.

To go on down to minus 100 is just an extension of the principle into three stages, giving us a ratio of a little less than four to one per stage. For this purpose we can use three compressors and three motors, or we can use one large single stage and one two-stage compressor driven by two motors or driven by a common motor. My company has one eight-cylinder compressor which has been rearranged internally to provide three stages in a single unit. For convenience, we break it down five cylinders in the first stage, two in the second, and one in the third. This expedient has obvious limitations due to the size of compressor involved for any appreciable output but it is interesting to know that it is technically possible to do it. The one unit we build has a capacity of about a quarter of a ton at minus 100 degrees F. on Freon-12 and about .4 ton on Freon-22 at this level.

At about minus 100 degrees F. we begin

to run into another problem on Freon-12 because of the very low absolute pressure. Most Freon compressors as built today use suction valves that are actuated by a differential in pressure—i.e. flapper valves seated by light spring tension. It takes anywhere from a few ounces to perhaps a pound pressure to permit a reasonable flow of gas into cylinders. This means that even though we attain a perfect vacuum in the cylinder at the bottom of the stroke, we have only 1.43 pounds total pressure with which to fill the cylinder at -100 degrees F. At minus 120 degrees, we have only about .65 pounds total pressure. By designing special mechanically actuated valves, we could overcome this particular problem but the few degrees gained don't seem worth the cost. Our practical limit on Freon-12, therefore, seems to be around minus 100 degrees to minus 110 degrees evaporator temperature, and our volumetric efficiencies are none too good even at that level, because of imperfect filling of the cylinders on the suction stroke. If we go to Freon-22, we can go about 15 degrees lower before this factor becomes critical.

I have so far mentioned only the compressor problem in this low temperature field and while this is the most complex part of the problem, I must point out certain factors that are important.

The condensers used may very well be the same types used for conventional work but the novice may be inclined to pick a size that is too small. When we look at a refrigeration rating of one ton we may be inclined to assume that condenser commonly used on a one-ton commercial unit would do the job. This is far from the truth, because the heat rejection factor on these multistage units is very high, a large percentage is superheat which lowers the overall K factor of condenser transfer, and gas velocities in the condenser are low.

The heat rejection factor at 20 degrees above zero is about 1.25—i.e. the heat dissipated by the condenser of a one-ton unit is about 15,000 BTU per hour at that point. At minus 20 it is about 1.6, or 19,000 BTU per hour per ton, and at minus 60 it is around 2.5 or 3. The lowered velocity in the condenser and the poor transfer characteristics due to the high percentage of superheat make it advisable to pick a condenser which would rate four to five times the actual tonnage when referred back to a standard commercial job.

Motor selection is another point of importance, and to indicate the relative situa-

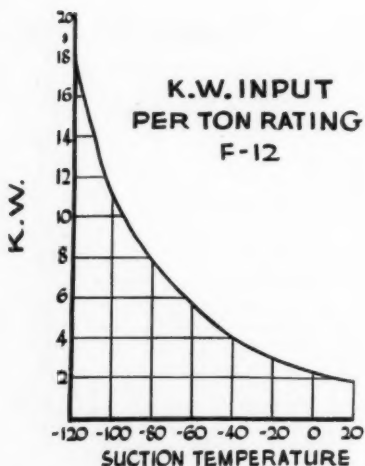


Fig. 3—Chart showing approximate current demand per ton in various brackets

tion, I have made up this curve (Fig. 3) showing approximate current demand per ton in various brackets. These are not theoretical figures but are averages of actual performance on commercially built units.

This is a curve that indicates approximately what we may expect to do. It has been smoothed out a bit where we move from three stage to two stage and from two stage to a single stage, but it is a fair measure of what we may expect to pay to drop our temperatures down the scale. Note that at 110° below zero we will buy about 14 KWH to get one ton hour of refrigeration, or about 350 KWH for a real ton of ice equivalent. At the usual commercial rate of 8c, we pay \$10.50 for a ton of ice in current consumption alone. This compares with \$2.90 at forty below, \$1.80 at zero, or \$1.50 at 20 degrees above zero.

We could draw some conclusions, perhaps, on these facts alone but to get a little more complete picture I have tabulated both displacement and efficiencies side by side on this chart (Fig. 4). These, in a measure, give us a clue to both initial investment and operating costs, at the various levels. I have also included a rough comparison of Freon-12 and Freon-22 so that we can see how much we might gain by shifting to this newer refrigerant.

These figures again are practical figures, and represent performance that has been demonstrated repeatedly in the laboratory and the field. The units on which the low temperature results are based are not exactly parallel with those in the higher brackets, because I have used tests on units of similar capacity rather than units of similar displacement. If you check these against the curve I just showed you, you won't find that they match exactly because, as I told you, I did some smoothing out on the curve to show the general trend rather than specific performance.

Now what can we see from these figures? First, to get a unit of cooling at 100 below takes about nine times as much compressor as at zero. To this we must add the cost of the second and third stages—perhaps 40% more. At 50 degrees below zero we need 2½ times as much as we need at zero, plus probably 30% for the second stage, but at 20 below we need only about 1½ times as much as is required at zero.

In operating costs our ratios are about the same as on displacement so that we can say that our overall picture is that it costs us from six to ten times as much to pick

DISPLACEMENT & EFFICIENCY F-12 AND F-22

TEMP. EVAP.	STAGES	BTU/HR. CFM.		BTU/WATT HR.	
		F-12	F-22	F-12	F-22
110	3	85	140	1.0	1.2
100	3	130	190	1.12	1.35
90	3	180	260	1.28	1.52
80	3	250	370	1.46	1.75
70	2	300	420	2.17	2.52
60	2	370	560	2.53	2.75
50	2	475	710	2.62	2.95
40	2	600	900	2.9	3.4
30	1	400	630	2.8	3.3
20	1	600	980	3.5	3.86
10	1	820	1300	4.2	4.5
0	1	1080	1650	4.9	1.92

Fig. 4—Chart showing Displacements and Efficiencies

up a ton of cooling effect at 100 degrees below as it does to pick up that same load at zero. It costs probably three to five times as much at minus 60 degrees as it does at zero. Perhaps some will take issue that this ratio is not so unfavorable in large units and I will not quarrel with this viewpoint, but the fact remains that no matter how much you scrape off in small increments here and there, you still have a terrific penalty as you go down into the deep subzero regions.

I would be stopping short of a complete story if I failed to point out that the problems of cabinet design, evaporator design, control selection, installation and service are also more complex as we go down in temperature. First, of course, we must reduce leakage as much as possible, for if we are going to pay a high price to take the heat out, then we must offset part of this cost by imposing barriers to its entrance. With conventional insulation, we approach fantastic figures when we try to do this, for as you know, the usual rule is to double the insulation thickness to halve the losses. If we use 4" insulation at a 50 degree differential—i.e. 40 degree cabinet and 90 degree air—we go to 8" for 100 degree differential, which is —10 degrees and 90 degrees, and so roughly 16" for —100 degrees in a 90 degree room. For space economy, we will naturally seek methods which afford lower losses per inch of thickness, and it appears

that the rather expensive insulants such as Ferro-Therm and Santocel are the only way to do this—that again means money.

Extra precautions are necessary in sealing against moisture penetration, for increased temperature differences mean increases in vapor pressure differentials. Breaker strips around door openings must be especially good, gasketing must be of a special type, and if we use glass, we will probably go to Thermo-Pane or some equally expensive method.

Our evaporators, too, must have extra surface, and must be designed for a minimum pressure drop. When you double your condensing unit cost with a drop to two pounds in suction pressure, you can't afford to be niggardly about your evaporator.

Selection and adjustment of expansion valves too is critical. If we use a thermostatic type we find that the extremely low vapor pressures have little power and if the valves offer some frictional resistance, the differentials on which they respond may be wide. This results in a slugging action rather than smooth throttling or perhaps starvation at certain pressures.

Controls, too, present a problem, for most low pressure controls have a minimum cut-off of 20" to 22" and even at this point they are not too dependable. Special thermostats in connection with solenoids permit placing the low pressure control in the second stage so that the system pumps down each cycle.

Lubrication

Although it may be classed as a purely mechanical problem, I think it may be well to mention the subject of lubrication. At first glance one is inclined to expect trouble from the congealing and dewaxing of the oil in the evaporator and lines, and in our early investigations, we expected that would be a major problem. We were agreeably surprised to find that most of the things we expected just didn't happen. We used our regular oil, which has a pour test of minus 20 degrees F., and a viscosity of 800 seconds Saybolt at 100 degrees. If you place a beaker of that oil in a minus 60 degree cabinet for several hours, it attains the consistency of frozen molasses and a nice little cone of wax will precipitate out in the middle of it. However, when you warm it up and subject it to moderate agitation it thins out and wax is promptly re-absorbed. Now if you add, say, 20% Freon—either 12 or 22—to that oil, cap it off in a closed glass cylin-

der and chill it down to minus 60 or lower, it retains its fluidity and the dewaxing appears only as a moderate suspended cloud in the mixture. If you agitate the container slightly even at these low temperatures, the cloud disappears and the mixture becomes as clear as gin.

We found, therefore, that this high pour point oil could be kept fluid and returned from a low temperature evaporator, provided we kept a reasonable saturation of liquid refrigerant right up to the point where the suction gas left the chilled space. In all cases where "dewaxing" trouble was reported, our investigations showed that the presence of moisture was the real cause of the trouble. Apparently the plugs forming near the expansion valves were a mixture of wax, congealed oil and ice, and apparently the ice prevented the wax and gum from dissolving in the refrigerant. The installation of a good drier cleared up this problem in every case that I know about.

Highside oil separators can be used, and some of our customers who use a complicated evaporator do use them, but they are not an unmixed blessing, for if the oil is carried too high in the compressor so that excess scrubbing is encouraged, or if there is even a minute leak at the needle seat in the separator, the high pressure gas fed back to the crankcase may reduce capacity appreciably.

Another problem in lubrication, however, has shown up where it was not at first expected. This problem is associated with overheating of the oil, which lowers its viscosity and impairs its lubricating qualities. In conventional applications the cold, high density gas carries compressor heat over to the condenser and the relatively large volumes of cold oil returning from the lowside help to hold the temperature of the compressors within safe limits. In these low temperature jobs, however, because of the low density of the suction gas and because of the fact that it returns highly superheated, compressors have a tendency to run comparatively hot.

The effects are even more pronounced with F-22 than with F-12 but in both cases we have found it necessary to use forced lubrication and circulate the oil through an external oil cooler on all except the smallest units.

Now that pretty well sums up the facts about extreme low temperature work, as seen from a compressor manufacturer's

point of view. These facts are not gleaned from isolated instances or laboratory testing, but are a composite of tests and observations on many hundreds of units scattered all over the country. It has been proved conclusively that these extreme low temperatures can be obtained using these popular, safe, chlorinated hydrocarbon refrigerants, if we are willing to pay the price.

The applications, so far, have been in war uses, where a tough job had to be done without very much regard for cost or complications. It has been like the aircraft business in that regard—if the Nazis and the Japs had combat planes that were outperforming our planes, nobody is going to argue about the cost of developing and building the P-38 Lightning or the P-47 Thunderbolt or that new rocket plane if that is what it takes to blast those birds out of the air and get this war over with.

By the same token, we can afford to invest five or ten thousand dollars in a test cabinet about twice as big as a household refrigerator, if that's what it takes to test instruments for stratosphere flying, or to dehydrate blood plasma for the injured fliers that come back in those planes. War is not bounded by the economic laws that control peaceful pursuits.

When the war is over, however, there will be little demand for airplanes like the P-47 or the Flying Fortress. You and I may want a personal plane, but we won't want to pay \$75,000 for a ship to do 450 miles per hour at 40,000 feet altitude, nor will we want to pay the gasoline bill for a 2000 horsepower engine. Industry will drop the war features of its products but it will carry over a vast fund of "know how" and experience, and many war-born inventions will play a part in peacetime products.

In our industry, as of today, the war job of subzero refrigeration is approaching a conclusion. Like all "tooling," the big demand came in 1942 and 1943 when instrument plants, aircraft factories, laboratories, and so on, were getting set to swing into mass production. We expect to see this field shrink rather rapidly in the month ahead, and our practical problem is to determine how much our knowledge and developments can help us to do a better peacetime job in the future. We can expect, of course, that industry will continue to buy some of this class of equipment for special duties after the war, and if costs are brought down a bit, some new industrial uses may show up. This, however, cannot very well be a big

market when measured up with the other refrigeration markets we know about now.

Food Refrigeration

We must turn, therefore, to that industry which has been the major field for refrigeration in the past—namely, food preservation—and ask ourselves, "How does subzero refrigeration fit into our picture?" At first glance, we might say, "Let's quick freeze our perishable food at 100 degrees retaining certain valuable properties, but *how* valuable are they? Is the result worth the price? Can we multiply our investment, depreciation, and operating costs five or ten times to get just a measurable improvement? I think the answer is "No," insofar as levels approaching minus 100 degrees are concerned. We just won't pump water up from a 100 foot well if we can get some that is almost as good from a fifty foot well or a twenty foot well.

The region around minus fifty is not so bad. It is possible, and even probable, that small and medium quick freeze plants may work in this region on economical basis. Perhaps it will be practical for the operator of a locker plant to install one standard single stage condensing unit with a reasonable margin of over capacity to handle his zero storage and then hook up his quick freezing section on a second compressor discharging into the suction line of the storage compressor. That practice has been prevalent in the ammonia field for years and it may be worked out satisfactorily in smaller sizes with the other popular refrigerants. With a well-designed evaporator, the freezing rate accomplished with this kind of a layout might very well bring in enough extra business to pay its way. This type of application, however, demands competent engineering talent to lay it out and skilled mechanics to install and service it. It is no job for the jackleg who picks up his elements here, there and yonder and throws them together.

We are now down to our industry's most promising embryo—the farm and home Freezer. What does subzero refrigeration offer?

The answers will probably depend on the outlook of the man you are talking to. They depend on what size and type of freezer you are thinking about and on the uses for which it is designed.

With regard to the small storage chest of two to six cubic foot capacity, or the

modified household refrigerator with extra freezing space, I think we can all agree. It is not a processing device, it is suitable for storage only, with the contents turned over very frequently and replenished from the retail store or the local locker plant. Zero is low enough for that job and we don't need anything special to get that. We just need a good, efficient single stage compressor and a properly balanced evaporator and control system. I can think of no good reason that Freon-22 should be preferred over Freon-12 for this duty and with certain types of evaporators, methyl chloride would be equally satisfactory.

When we go up a step to what I call a suburban or semi-rural freezer, we will need facilities for freezing as well as storing. This buyer needs from ten to thirty feet of storage, and he may freeze local meat, game, fish and the fruit and vegetables from his garden. These products, and especially the fruit and vegetables, should be frozen faster than you can freeze at zero. It is true that if you just pile the warm packages in with the cold ones in a storage chest at zero they will eventually freeze. It is probably, also, that they will be edible after several weeks or even months, but all of the experts who have conducted research on the subject agree that the results are far short of ideal.

Freezing Space Needed

We need instead a freezing space apart from the storage space, operated substantially below zero and arranged to extract the heat from the produce as fast as possible. It seems to me that contact plates or a well allowing submersion in a neutral "brine" or syrup offers the best answer to this problem. Maybe we can find a way to two-stage this application at moderate cost and thus not penalize the unit designed for the storage space by oversizing it too much. Freon-22 might have some advantage in keeping pressures up out of a vacuum. In any event we will need a better than average compressor, with enough capacity to take up the maximum daily freezing load without penalizing the storage space. Fluctuating storage temperatures, you know, are the enemy of good frosted food. Since the freezing load will be intermittent and for a few hours at a time, it may be well to build some hold-over into the storage evaporator and not depend on the hold-over in the food itself.

In the real farm freezer, where a winter's

supply of fruit and vegetables can be processed in the summer and a summer supply of meat processed in the winter, we need a little of everything. Forty above for fresh food and for aging meat—zero for frozen storage, and a good husky sharp freezer that can take real quantities at one time. The larger jobs will be good walk-in coolers with zero and subzero space built inside of them. Two separate condensing units will offer the most economical layout for low operating cost and perhaps there is a simple and practical way to team these up in tandem for the quick freezing job. Again Freon-22 or a similar refrigerant may have some advantages.

The refrigeration business has always offered a challenge to the ingenuity of the men responsible for its progress. There is never a dull moment in this business, and certainly there shouldn't be any monotony about the problems of subzero refrigeration in the years ahead. If it ever becomes a cut-and-dried business like insurance, or nails, or lumber, I for one am going to get out of it.

In closing, I cannot refrain from quoting an old refrigeration engineer whom I knew about twenty years ago. He said, "There never has been but two real problems in this refrigeration business—and those are keeping your suction pressure up and keeping your head pressure down." I guess that when you look back over my talk this evening you'll agree that's about all I said.

RAILROAD AIR CONDITIONING

AS a result of heavy war demands for Freon, a chemical refrigerant, air conditioning of railroad equipment will be curtailed this summer, Brig. Gen. C. D. Young, acting director of the Office of Defense Transportation, announced March 21. Additional supplies are in prospect for later in the year, General Young said, but may not be available in time to change the situation as far as air-conditioning railroad equipment this summer is concerned.

K. C. Robinson
Tufts Cove, N. S., Canada

Please find enclosed a money order to cover the cost of my subscription for one year for THE REFRIGERATION SERVICE ENGINEER. I find your magazine very helpful in my work and would not be without it.

News Briefs on War Regulations

Service Shops Asked to Prepare for Summer

LOOKING ahead to a hot summer, the War Production Board on March 22, authorized refrigeration service shops to get ready for a big season of refrigerator repairs. Shop owners were advised to place orders now for parts and materials which they will need this summer, and procedures were set up for such orders.

Parts and Materials

A procedure has been established for obtaining parts requiring ratings and materials requiring an allotment symbol, WPB explained. Controlled Materials Plan Regulation 9-A provides a method for repair shops to obtain parts and materials for domestic refrigeration repair services. Order P-126 makes provisions for repair shops to obtain necessary parts and materials for commercial and industrial refrigeration repair services. These orders should be supported by the proper allotment symbol or preference rating, and if one supplier is unable to fill the order, other sources of supply should be investigated.

Parts and materials for domestic refrigeration repairs have been difficult to obtain in the past, but recent developments have begun to relieve this situation, WPB said. Many repair shops which formerly have placed orders and were unsuccessful in having their orders filled have assumed that those particular parts or materials are simply not available. This is the wrong assumption, WPB said. Orders should be placed again since the desired parts or materials may now be available.

Electric Motors

The suggestion applicable to parts applies also to electric motors. Some new motors although they are very scarce, are appearing on the market. In addition, some motors are available on an exchange basis through repair service stations established by motor manufacturers. If the refrigeration service shop operator will take a few "bad-order" motors to a manufacturer's service station, he may be able to obtain a few rebuilt motors in exchange. This, in itself, will be a

tremendous help in meeting emergency service demands during the peak summer period. If the service shop uses this method before the summer emergency period begins, it may be able to repeat it and thereby maintain an emergency stock on hand.

Gasoline and Tires

Transportation during the peak service season presents a problem that requires preparations in advance to meet gasoline and tire needs. If an operator finds that he will require a larger mileage and fuel allotment for the peak service season than allowed by ODT, provision is made for an appeal through ODT channels for an increase.

Private passenger automobiles used as service cars but not converted to truck use, are subject to OPA regulations. Operators of these vehicles obtain authorizations for gasoline rations from the local OPA War Price and Rationing Boards. Allotments of gasoline for both trucks and passenger cars are made on a quarterly basis.

Applications for certificates to acquire tires, whether for trucks or for passenger cars, are handled by War Price and Rationing Boards.

Applications for second- and third-quarter gasoline allotments should be supported with complete information about the operation of the repair shop, and the tremendous increase in demand for refrigerator repair service which comes with the arrival of summer should be explained carefully, WPB said.

§ § §

Information on Increased Supply of Materials

INFORMATION which should be given by persons applying for increases in their maintenance, repair and operating supply (MRO) quotas under CMP Regulation No. 5, has been spelled out in Direction No. 18 to that Regulation, the Controlled Materials Plan Division of the War Production Board announced March 20.

Items of information which should be given are:

1. Name of product(s) manufactured or description of services rendered;
2. Show what quarterly quota you were authorized under paragraph (f) in 1943. (If

operating on a seasonal basis, show for each quarter of 1943). If you received a special authorization for any quarter, show that for each such quarter in addition to the "base" quota;

3. Statement of total dollar value of deliveries of your product in 1942, and first and subsequent quarters of 1943, by quarters. Show deliveries for each quarter by principal Claimant Agencies;

4. Statement of total amount of MRO requested to be authorized per quarter. This should include the base quota already permitted by paragraph (f) (1), (2), or (3) plus the increase requested;

5. Statement of total amount expended during 1943 for minor capital additions under paragraph (b) (3) of the regulation;

6. Statement of deliveries of your product scheduled for quarters for which MRO increase is requested; and

7. Any additional information which may be pertinent to proper evaluation of the application.

If any of the above questions do not apply to a specific business, information which is comparable to that requested should be set forth in the applicant's letter. All such applications should be filed with the War Production Board, Washington 25, D. C., Reference: CMP Regulation No. 5.

This list is important in view of the recent amendment to CMP Regulation No. 5, which permits a person who has been granted an increased MRO quota, for other than a special circumstance such as retooling, to continue to use such increased quota during quarters subsequent to the one for which it was originally granted.

§ § §

Specifications for Condensing Units Revoked

SPECIFICATIONS for refrigeration condensing units for industrial and commercial refrigeration and air conditioning machinery and equipment were revoked by the War Production Board March 10.

The most important feature of the action was the removal of the prohibition on the use of steel in the construction of bases for refrigeration condensing units having motors over 20 horsepower in size. Revocation of this restriction will save valuable man-hours formerly required to erect concrete bases at the time of installation of the unit, WPB explained.

The original purpose of this provision was to conserve steel, but now that the type of

steel required is generally more available, it is considered more important to conserve manpower.

The action which revoked Schedule II to Order L-126, Industrial and Commercial Refrigeration and Air Conditioning Machinery and Equipment, also removed standardization restrictions which limited the number of models that each manufacturer could produce. Since a large percentage of the units now being produced are for military use and since those produced for the Army, Navy, and Maritime Commission were exempted from model standardization, it was felt by WPB that these restrictions were no longer necessary.

§ § §

Motors Available on AA-3 Preference Rating

REPAIR shops may use the AA-3 preference rating assigned them by Controlled Materials Plan Regulation 9-A to obtain fractional horsepower motors from dealers, wholesalers or motors agencies, the War Production Board announced March 10.

The AA-3 rating of CMP regulation 9-A was assigned on November 25, 1943, to electricians, plumbers, motor rewinders, electrical contractors, carpenters, blacksmith shops and farm machinery, radio, refrigeration, boiler, automotive, upholstery and bicycle repair shops to enable them to obtain more readily parts and materials for their operations, WPB explained.

Any dealer, wholesaler, or motor agency having fractional horsepower motor for sale is required to honor the AA-3 rating from repair shops if the motors in stock are not needed to fill orders bearing better preference ratings. However, the buyer must be willing to meet the seller's regularly established prices and terms of sale or payment.

Any seller who fails or refuses to accept an order bearing a preference rating may be required, upon written request of the person placing the order, to give his reasons in writing for such failure or refusal.

Since the demand for fractional horsepower motors for combat services is unusually large, it is necessary to restrict their sale to essential purposes. For this reason, only those fractional horsepower motors needed to replace broken-down motors may be sold without a rating, and these replaced motors must be taken in exchange to be repaired where practicable and to be resold under similar conditions. Motors for any

(Continued on page 40)

Service Pointers

Practical Service Men Tell How They Meet New Repair and Service Problems

UNDER this department a number of practical service men show a commendable cooperative spirit in passing on to others information on special repair and service problems that may be of much value in these trying times of material scarcity and shortage of competent help. We believe if more readers would send similar contributions, making **THE REFRIGERATION SERVICE ENGINEER** a medium for the exchange of information on service, much benefit would accrue to all. Similar contributions are solicited from all readers.

DIAGNOSING SOUNDS TO LOCATE MECHANICAL TROUBLES

By M. B. Horwitz

OFTENTIMES we have heard when the gang gets together, the following conversation:

A—"It sounded like a terrific wrist pin tap."

B—"You're crazy; that tapping sound comes from a split pulley."

C—(walks in through the door, cocks a shrewd eye and bellows) "You're both crazy. There ain't a mechanic or serviceman around who can tell what's wrong by the NOISE a unit makes!"

Well, after listening to any number of C's talking like that for any number of years, we thought it was about time to do something about it; henceforth this article.

To begin with, A and B are on the right track, but different in the diagnosis. C, however, uses a word in his sentence which actually tells us why he believes that "there ain't a mechanic or serviceman around who can tell what's wrong by the NOISE a unit makes." We refer, of course, to the word "noise."

To the every day user of a household refrigerator, he would describe his box as being noisy or that it makes a lot of noise, but to the serviceman, it should mean much more than just being a NOISE. It should tell a story. This noise should be broken down into a sound—into a specific SOUND; in fact, into various classifications of SOUND. The difficulty, however, lies in the fact that although two seemingly identical sounds may be caused by two entirely dif-

ferent reasons, upon closer study of these so called identical sounds, they are actually as different as finger prints. Classify these sounds!

Here is an example of what we call basic "Sound Diagnosis." Most servicemen are familiar with the Seal Squeak, yet each make of compressor, due to its own peculiar construction will emit a slightly different kind of Seal Squeak. To continue, should you place several differently constructed types of bottles along side each other and tap each one of them with a mallet or spoon, etc., they will each give off a different sound due to their individual construction. On the other hand, should you use the same make of bottles and fill each with a different level of water, they also will give off different sounds. The point to remember, however, is "Sound Diagnosis" shows us that in the first case, there were different sounds in different keys, and in the second case, the sounds are different but in the same KEY.

As related to Seal Squeaks and further basic study of diagnosis through sound, we find that the seal squeak is a SPECIFIC sound only associated with seal squeaks. Furthermore, differently constructed compressors will give off different types of seal squeaks, yet the *specific* or basic SOUND is the same—that of a seal squeak.

At this point, we are usually confronted by the argument—"But we have heard different seal squeak sounds made by several compressors, yet are all identically constructed?" The answer is still the same. The specific sound was that of the seal squeak. The intensity or volume of sound, which is usually mistaken for a different

sound is caused by other factors such as the oil level, if any, in the compressor, the amount of refrigerant circulating through the pump, the head pressure, the ambient temperature, etc.

"Sound Diagnosis" proves that a specific IDENTIFYING sound, not volume, is caused by a specific mechanical breakdown. The volume or tone is only the associated sound which might tell the extent of unseen damage involved, but the SPECIFIC sound remains the same. Identify and classify these specific sounds.

§ § §

SUGGESTION FOR QUESTION 590

By Edwin J. Smith

I HAVE had quite a bit of experience on the working of G.E. sealed units. From the symptoms this service man gives I suggest he check the check valve on this unit by all means. If the unit has a bad check valve it will give exactly the same symptoms he has stated. The unit will freeze okeh, but when it cuts-off the evaporator will defrost due to the hot gas returning to evaporator. Then if the check valve should hold okeh for a few cycles the unit will work normal.

A bad check valve will also make the unit run more than it should. The best way to test the unit for a bad check valve is to put

your ear on the unit while it is running, then turn it off. If you can hear a click and a hiss this shows the check valve is okeh. You can also tell by feeling the evaporator when you turn the unit off, if the check valve leaks you will be able to feel the evaporator getting warm due to the hot gas returning to it. If you do not hear a click and a hiss this shows the check valve is not closing on the off cycle.

I hope this bit of information helps solve your problem. The reason I feel it is the check valve is because a new control has been put on and it did not help. This is only a suggestion, which is worth trying.

§ § §

SUBSTITUTE MOUNTING SPRINGS

By Hilding C. Anderson

WHEN you do not have a mounting spring to put under a household unit, try using old nose seal springs. I started this stunt last summer and they work very nicely.

§ § §

Karl Windahl
Oaklawn, Ill.

I am a subscriber to your magazine since 1935 and have found your magazine to be very helpful.

*Ah just cain't say where the seat of the trouble is—but
Ah cain't get it to freeze ice at all any more.*



The Question Box

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment to "The Question Box."

RECLAIMING FREON

QUESTION 596: We have some Freon which we believe contains moisture. We also know that it is loaded with oil. Does it matter if the oil is in it? What is the best shop method to use to get this Freon dry and how can it be tested to be sure that it is dry?

Will you kindly advise the correct procedure to blow out and dry out an ice cream cabinet? Is it best to blow out a system containing moisture? Does CO₂ absorb moisture when passing through the system? Should expansion valves be removed when blowing out the system with CO₂? At what temperature should the box be carried while pulling a vacuum on it and how long should a vacuum pump be used on a system to safely say that it is free of moisture?

ANSWER: I believe the Freon you now have in a container can be best reclaimed by using a condensing unit to pump it out of the container, being sure to pump nothing but vapor, and in this way, to perform what might be called a distilling operation on it.

It would probably be necessary to place the drum in a container of water which can be kept warm while you are pumping the vapor from it. It would also be advisable to pass the vapor through a large size dehydrator in order to remove as much moisture as possible while the distillation is going on. In this manner, you would remove practically all the oil and quite a large part of the moisture; however, you may not remove all the moisture and there is no way that I know of with the equipment that you would have around your shop to test the moisture content before using the Freon. The Freon, however, could be used in a machine with the additional precaution of inserting a drier unit in the system, after the gas has been charged in.

With reference to drying out an ice cream cabinet, if the system is suspected of containing a large amount of moisture, it is advisable to blow it out with CO₂. Expansion valves should be removed and separately cleaned and dried. The system should be warmed up to atmosphere temperature before the blowing out operation is done, be-

cause moisture may be held in ice particles frozen to the wall of the tube, and may not be removed without blowing out, unless the system is warmed up. CO₂ will absorb moisture to some degree, but cannot be relied upon to dry out the system just through the absorption itself. Likewise, drawing a vacuum on the system will not dry it out unless you also go to the extent of warming the entire system to a temperature of 200° or 250°.

The vacuum will remove the air from the system and any moisture contained in that air, so that it is always advisable to pull a vacuum on the system before recharging it. I would suggest your best procedure in this case is to blow out the system with CO₂—then recharge it with fresh oil and refrigerant—then place a large size drier unit in the liquid line. It may be necessary to replace this drier within 24 hours, and again every 36 to 48 hours thereafter, depending on the condition of the drier when removed.

If, after the first drier has been removed, it shows little indication of having absorbed any moisture, you can assume that there is very little moisture left in the system and the next drier can be left on for a period of two or three weeks.

SYSTEM FLOODED WITH WATER

QUESTION 597: I was called to install a Taylor ice cream freezer and hardening cabinet. This is operated with a Copeland 1 hp. water cooled compressor. When this party called me to install it, I asked him if this machine had been taken out by a competent mechanic and, of course, the answer was "yes."

In the first place, I found that all the lines on the cabinet were open as well as the lines on the Copeland compressor. I went ahead and hooked the job up and began to charge the system with methyl chloride. I found that the refrigerant was coming out of the drain pipe from the water valve outlet. I removed the water cooled condenser and shipped it into the Copeland firm for re-building, had this completed and re-installed it. I then found that the entire cabinet lines were full of water. Evidently the

party that disconnected this unit, merely released the refrigerant into the air and the quick expansion action broke the refrigerant lines in the water cooled condenser; therefore filling the entire system with water.

I disconnected all the lines and carried perhaps 20 cylinders of air to this job. I released it into the system and let it out at the $\frac{5}{8}$ -in. connection at the compressor suction inlet. I disconnected this from the compressor, however and blew water across the room. When I had what I thought was the greatest part of this water removed, I connected a cylinder of methyl chloride to the inlet by removing the expansion valve, and then placed the cylinder in hot water and built a pressure up to 300 lbs. before I released it into the system. I did this about three times using about 10 lbs. of refrigerant. I connected the lines and charged the system. It started to operate and, of course, the thermostatic expansion valve froze open and the crank case would freeze up. I instructed the user to operate this by hand for a week or so; then I would remove the dehydrator and refill again with Silica-Gel, and continue this procedure for several weeks. I have refilled this Mueller dehydrator at least a half a dozen times now and it has a capacity of 50 cu. in.

I turned the freezer valve open and this is operated with a straight expansion valve, but no refrigerant would pass. I tried heating the valve and every other method, but to no avail. I then removed this automatic valve and installed another. I got results for a short time, but after I turned off the hand control valve and then reopened it after a few minutes, it worked just like the other one did. I refilled the dehydrator again last week and the machine seemed to work fairly well, but when I opened up the hand control valve for the ice cream freezer, no refrigerant would pass. I tried hot water applications on the valve, but to no avail. I then by-passed the refrigerant through my gauges until I equalized the pressures and this opened the valve. It worked all right for a short time; however, I advised the owner to let this refrigerant by-pass through this Automatic expansion valve at a high velocity as it was for a few hours. This would help to pass the refrigerant through the dehydrator that much faster.

The user called me again and told me that the thermostatic expansion valve in the cabinet would either freeze open or shut, running continuously part of the time, or passing no refrigerant and short cycling. He in-

formed me that when he opened the hand valve that no refrigerant would come through the Automatic expansion valve in the ice cream freezer.

He has not been able to use this machine and is getting rather impatient, yet I do not know what I can do, other than what I am or have been doing. I advised that he should remove the entire cabinet and compressor and ship it in to some factory rebuilding shop that has oven equipment, so that it may be baked out.

He told me that someone had informed him that one could blow hot air through the system and dry it out in this manner, and said that he was told that there are machines available for this purpose. I told him there are none to my knowledge.

Could you give me any help or sound advice on this and would you continue to refill this dehydrator with Silica Gel, or would you advise some other drying agent, temporarily? If you have any suggestions, I surely would be more than grateful to you for any assistance you can give me.

ANSWER: You ran into a problem indeed when you took on the installation of the Taylor ice cream freezer. To remove the amount of moisture found in this system, it requires quite a little work, and one can be sure of having a certain amount of trouble no matter how much work is done. I think perhaps the use of alcohol might have been better in this particular case as the first means of cleaning out the water. In other words, instead of using air or gas to blow out the water, and then rely on dryers, it would possibly have been better to have blown out the excess water with compressed air—then circulate two or three gallons of alcohol through the system, which would mix with the water and dilute it so that there would be little remaining. The alcohol, in turn, can be removed much more readily by evaporation than the water.

At the present time, it is quite probable that there is not sufficient moisture left in the system to use alcohol—therefore, some other means should be taken.

Your customer is right, in that there is a machine for drying out these systems. It is known as the Lectrodryer and made by the Lectrodryer Corporation, P. O. Box 1766, Pittsburgh, Pa. I believe that the company makes some arrangements for rental basis, or to send a man out with the unit to do the drying job. I am not sure whether they will travel so far away as your locality, but if you get stuck, it may be worth writing them.

The use of heated dry air works out pretty well in some types of systems and home made devices have been used to some extent by men in the field. It is the usual practice to use electrical heating elements such as those used in sunbowl heaters, enclosed in some sort of a casing, through which the air can be drawn. A large area dryer filled with calcium chloride should be placed ahead of the heater so that the air drawn through the drier, then through the heating elements through the system, finally being discharged through the vacuum pump. This method of drying depends on the large quantities of air you can draw through the system, the heat transferred by the air to the system in order to warm it up, and finally the dryness of the air to absorb moisture in the system as it passes through.

This method would be satisfactory for direct expansion coils. If your freezer or hardening cabinet contains brine, the brine would have to be removed. This drying method would not be satisfactory on flooded type systems where the coils are of the header type, the low-float type, or any other construction which may by-pass the passage of the air. In other words, it boils down to the fact that the only type of coil on which it could be used is the continuous tube type. While Silica Gel is a good dehydrating agent, I don't think the results obtained with it will be as rapid as with calcium chloride. Where there is a large amount of water in the system, calcium chloride will absorb a greater amount in a shorter time, but it will require more frequent changing of the dehydrant.

Calcium Chloride, of course, will go into solution and be carried through the system if left in the system too long and too much moisture is combined with it. It is, therefore, advisable to put the drier in it for not more than 12 hours the first time—then remove the drier, inspect it and determine from its appearance whether it has absorbed much moisture, and continue in that manner from thereon, lengthening the period before removal of the drier in accordance with the amount of moisture that is being absorbed.

You did not state in your letter whether or not you had removed the oil in the original charging of this machine, but I assume that the oil was changed and that there is no possibility of water being held at that point. I think I would advise the use of calcium chloride in your drier until such time as the moisture has been reduced to a minimum—then use Silica Gel.

CONGEALED OIL OR WAX CLOGS COIL

QUESTION 598: In a local restaurant, we have a 1½ hp. methyl condensing unit connected to a Temprite water cooler and a walk-in cooler which is cooled by the use of finned coils measuring 12x14 inches x 3 ft. long. This coil has a T. E. valve and also a check valve in the discharge line.

Our trouble is that the T. E. valve sticks up especially after a defrost period. After pouring considerable hot water over the coils and sometimes over the T. E. valve, the coils open up which is evidenced by loud snapping noises within the coils. We have two dryers in the liquid line, one being located just ahead of the T. E. valve. Three different makes of T. E. valves have been used with the same results. We changed the T. E. valve from a top feed to a bottom feed on the finned coils and find the results are the same. The T. E. valve is located within the cooler about 4 inches away from the finned coils. No trouble is ever experienced with the Temprite cooler. A surge tank is also used.

To us it seems that some foreign material is present in the coils which stop the circulation. If it were moisture, it appears that with a little hot water, the valve or coils would soon thaw out. This is not the case here as it takes several gallons of hot water over the coils to open them.

Can you advise what causes this trouble? We have a G. E. conditioned air cooling unit which we can use in this cooler, but we do not like to do this until we know more about the trouble we are having with the finned coil sticking up.

ANSWER: It would seem to me from the description you have given of the troubles you are experiencing in the restaurant installation that oil in the system may be congealing in the coil. You state in your letter that it takes quantities of hot water poured over the coils and occasionally over the thermostatic valve to open it up.

If it is actually the coils that become stopped up, it doesn't seem possible that there would be sufficient moisture in the system to freeze up the coil itself—then too, any moisture in the system would affect the valve before it could possibly affect the coil. This leaves only two things in my mind which can be causing the trouble. First, that the oil used in the system is too heavy, or of a poor grade and is congealing in the coil

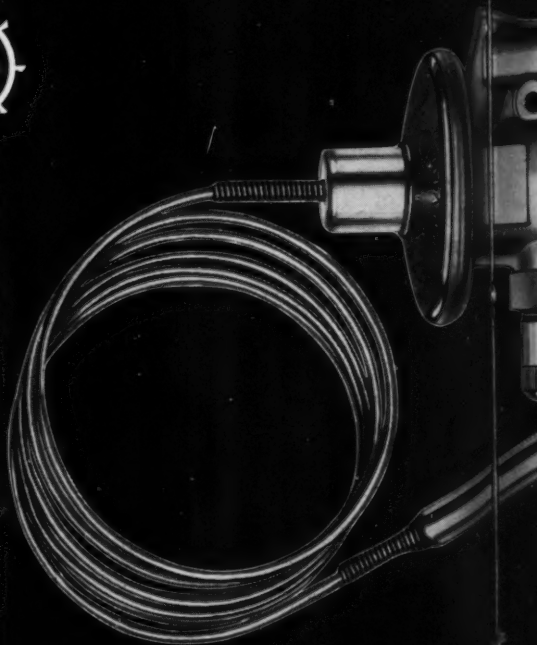
(Continued on page 40)



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Deferment of Repair Men Sought by Refrigeration Service Council

THE new method of operation in the Selective Service System threatened to call all physically fit men up to age 26 and later to take most of those up to age 38. Realizing that this course would impair refrigeration service everywhere and eliminate it in certain communities, John Wyllie, Chairman, and W. R. Kromer, Director of the National Refrigeration Service Committee, made a rapid survey of the present manpower situation in the industry.

Responses received from every section of the country gave data revealing a most critical situation. With this data in hand a meeting of the committee was called in Washington, D. C., on March 28, 29. Following presentation of the detailed situation to the committee it was decided to make the facts known to appropriate government agencies and seek their aid to avoid serious breakdown of refrigeration service operations in the near future. Accordingly a brief report and analysis was drawn up and presented to these agencies:

Report of National Refrigeration Service Council

It is a matter of record that on the average, domestic mechanical refrigerators require one essential service call per four years, in order to keep them in operation, and that for the average commercial or industrial installation, one call per two years is required. There are some 20 million domestic refrigerators in service and about three million commercial and industrial units. Failing to receive these essential calls, plain arithmetic shows that some 5 million domestic refrigerators will cease to function during the coming year, and that one-half of the commercial and industrial units will go out of service.

What would happen if such a thing as the stoppage of this quantity of refrigerating units were actually to take place? In the first place, many war plants would cease to function or at least would go back to the production of an inferior product and would be required to employ additional labor. Secondly, there would be a food shortage which would make present rationed quantities

seem generous by comparison. Thirdly, blood banks, serum stores, and other medical supplies would suffer. Fourthly, food spoilage and contamination, both in the home and in the channels of distribution would bring about cases of malnutrition and food poisoning of epidemic proportions.

In former years, when new equipment was readily available and before the war effort made its demands for additional refrigerating equipment, over 20 thousand refrigerator repairmen stood between us and the eventuality which has just been pictured. Today that number has been reduced to about 6 thousand, and those remaining repairmen are the last line of defense.

An authoritative and nation-wide survey, conducted during the current month by the National Refrigeration Service Council, reveals that today mechanical refrigerator repairmen are working an average of 56 hours per week, but despite these long hours, are unable to keep abreast of essential maintenance work. During the heat of summer, breakdowns will occur at about twice the present rate, but there will be no additional repairmen available to take care of them. It is also to be noted that at the present time, when repairs are not made promptly, food spoilage can be retarded by outside low temperatures. This will not be the case in the summer. If plans at present being considered are carried out, there will be many less repairmen when summer arrives, and how nearly we approach a national catastrophe depends upon how many less that number turns out to be. And lest the impression be given that it requires a reduction in the present number of repairmen to bring about such a condition, may we say that the conditions referred to will occur in serious measure, even if every repairman now available is retained at his occupation.

Last summer there were cases of food spoilage resulting in illness and actual deaths, and the situation appeared so critical that General Hershey was prevailed upon to send a telegram to State Selective Service Headquarters, urging the protection of the refrigerator repair industry during the period of summer heat. No one has questioned the advisability of that action. Since last summer nothing has happened to decrease the need for refrigeration. On the contrary, there have been additional war plant installations put into operation which require

service, and all of the other equipment in service is now one year older and, therefore, more likely to break down than heretofore. Coupled with that, the number of repairmen has decreased at an alarming rate since last summer and is decreasing even more rapidly at the present time.

In line with every other essential industry, the refrigerator repair industry realizes that it must train new personnel in order to permit the separation of trained workers and in order to meet the increased demands placed upon it as an industry by the war effort. As a result and with government help and cooperation, a training program has been established in the refrigerator repair industry, which has been acknowledged as a leader of its kind and which will, when completed, go far to solve the present shortage. But, and this point cannot be forgotten, this program did not become operative until the beginning of the current year, and over two years are required to train a repairman. Next year and year after that, these trainees will begin to carry some of the load. This year, however, they are still only trainees and nearly the entire training program is still ahead of them. Furthermore, and of equal importance, the entire success of the training program depends upon the availability of qualified instructors, who are themselves the same men who are now rendering the daily maintenance and repair service.

Refrigerator repairmen have long since ceased to be protectors of our comfort or a service to our convenience, but are now essential to our actual existence and to the prosecution of the war effort. As such, and because of the few who remain, in proportion to the size of the job which they must do, they are in need of the utmost protection which can be given to them under Selective Service classifications.

In summation, we wish to point out that there were formerly over 20 thousand qualified repairmen in the industry. Of these only some 6 thousand are left. Of this remaining number, approximately 50 per cent are under 38 years and, therefore, subject to the draft. About 10 per cent are under 26.

The case of those repairmen under 26 years of age is no doubt the most difficult to handle, but in connection with this group and in addition to their general essentiality, we must point out that in many territories the only remaining repairmen are individuals in this low-age group, and unless they are so classified as to permit their deferment when they are so situated, the coming summer will find those particular territories with no repair or service facilities whatsoever, and with no hope of getting any. In such territories, the possibility of one domestic refrigerator out of four and of one commercial or industrial installation out of two

remaining out of service will actually be realized. Out of a total of the 600 repairmen who are in the age group under 26, about 200 are the sole source of service in their respective communities. The number involved, therefore, is almost negligible so far as the effect on any other phase of the war effort is concerned.

Because of the conditions above described, it is essential that qualified mechanical refrigerator repairmen not only be retained on the critical occupation list, but furthermore, that due to the special effort now being made to induct young men, a procedure be established so that in those areas where only repairmen of under 26 remain as the sole source of service, they too be made subject to deferment.

All of the statements made in connection with this report are the result of careful and extensive analysis and can readily be substantiated.

Respectfully submitted,
NATIONAL REFRIGERATION SERVICE COUNCIL

Committee Meets

The committee met with Webster Powell, Office of Civilian Requirements, Sterling Smith, Refrigeration and Air Conditioning Section, WPB and other war agency representatives. The situation was described to them and they suggested the proper course in seeking remedial measures. Mr. Powell also described the course of action to follow on individual cases at the local level. Under the new policy deferment will be granted only on certification by the State Director of Selective Service.

In most cases it will be obtainable only if requested by a claimant agency such as WPB. The assistance of the WPB representative, therefore, should always be solicited when an appeal for deferment is carried to the State Director of Selective Service. No list of the WPB manpower representatives has been issued but the name of each will be obtainable from the WPB office in the city where the State Selective Service Headquarters is located. A full statement of the essentiality of the man in question should be furnished in writing to the WPB manpower representative. This should not only describe the experience and competence of the man but also should give complete data on the refrigeration service situation in his community and the effect his withdrawal will have on continued refrigeration service there.

No blanket deferment of all service men of draft age can be expected. Each case will be considered on its individual merits with

regard to the importance of the man to the continued existence of refrigeration service in the community. That is why it is so necessary to furnish a full statement of the facts on the local situation in connection with appeals for deferment.

Emphasis should be repeated on the necessity of prompt, careful handling of each step in the regular procedure for securing deferment of essential personnel. When the service man is reclassified 1-A he should immediately request a personal hearing before the board. Secondly, he or his employer should send a letter to the board requesting that the case be processed in accordance with Selective Service Procedure No. 115-B. Finally the employer should complete Form 42-A including definite statement that he "appeals the reclassification" and file it with the board.

Service Council Expanded

At the Washington meeting the name of the manpower service committee was changed to the National Refrigeration Service Council. Chairman John Wyllie announced the appointment of three new members and the appointment of four National Coordinators to assist local councils in solving manpower service problems:

Phil Redeker, Coordinator of Selective Service problems, will be available to assist Local Councils with Selective Service problems when all efforts at the local level have been exhausted and results unsatisfactory. (Address: Refrigeration News, 5229 Cass Ave., Detroit 2, Mich.)

Emerson Brandt, Coordinator of Wage and Price problems, is to be contacted by Local Councils when endeavors to adjust wages and prices at the local level have proven unsuccessful. (Address: Refrigeration Service Engineer, 433 No. Waller Ave., Chicago 44, Ill.)

Warren Farr, a member of the original committee, has been appointed Coordinator of Procurement and Training. He will be available to assist Local Councils in meeting their problems of procurement of trainees and assist in the solution of training problems that may arise and cannot be expediently handled locally. (Address: Refrigeration Maintenance, 1127 Carnegie Ave., Cleveland, Ohio.)

Harry Alter, Coordinator of Parts, Supplies and Priorities, may be contacted by Local Councils on problems arising on parts, supplies and priorities that cannot be han-

dled satisfactorily locally. (Address: The Harry Alter Co., 1728 S. Michigan Ave., Chicago 16, Ill.)

Each of these men has been furnished with a list of all existing local Refrigeration Councils and will be advised of any newly formed. Each of these men will in the very near future offer constructive suggestions for handling various situations at the local level.

At national headquarters in Cleveland, W. R. Kromer, Director, will continue to handle organization problems of existing and new councils. Those interested in establishing councils for the training of manpower for service work should write Mr. Kromer at 1885 East 24th Street, Cleveland, Ohio.

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REFRIGERATOR REPAIRMEN SCARCE IN RICHMOND, VA.

REFRIGERATOR servicemen in Richmond, Va., are as overworked as a ration book, according to a survey made by the Virginia Chapter of the Refrigerator Service Engineers Society, which reported that the men are averaging a working schedule of 12 hours a day each. There were 112 men available in the city before the war, of whom only 45 are left, according to R. W. Lampie, secretary-treasurer of the chapter.

"Reports received show that of the 45 still here, six now are in 1-A, 23 are within the draft age and 14 have received a six-month deferment beginning in November and December, 1943," Mr. Lampie said. The condition is expected to become even more acute, because the busy season has not started, Mr. Lampie explained.

The survey was made at the request of Director W. Ray Kromer, of the National Refrigeration Manpower and Training Program, Cleveland, Ohio, who has sent a six-point questionnaire to local societies throughout the country.

Besides questions on available men and their draft classifications, the organizations are asked to tell how a lack of manpower interfered with industrial efforts necessary to the war effort, or caused spoilage of food-stuffs.

§ § §

Pvt. B. G. Thornton
Shaw Field, S. C.

"I always look forward to reading your magazine every month. Only wish it came more often."

Training Program for Refrigerator Repair Men Moves Ahead

THE program for the training of refrigerator repair men, organized through the National Refrigeration Service Council, with the official blessing of the War Manpower Commission, is moving ahead on a satisfactory basis with training courses already established in many cities. These training courses will run usually about ten weeks. Trainees new to the refrigeration industry will attend three-hour classes five nights a week while employees who wish to be upgraded as repair men will attend three night classes per week.

New York City

Following an open meeting sponsored by the Refrigeration and Air Conditioning Guild, Inc., held in New York City, Nathan Edelstein, local coordinator, announced that the program for the training of refrigerator repair men was nearing completion. An appeal for materials to be used by the school during meeting brought promised donations of enough equipment for two or three classes.

Los Angeles, Calif.

Three hundred members of the Southern California refrigeration industry met at a dinner session in the Rosslyn Hotel, Los Angeles, on the night of March 24, where plans were outlined for cooperating with the refrigeration industry in developing a training program for new employees. Unanimous cooperation in a proposed trainee program which was decided upon for immediate initiation was promised by representatives of the Office of Price Administration, War Production Board, Office of Civilian Requirements and the Training Within Industry branch of the War Manpower Commission.

T. H. Chamberlin, president, Los Angeles Chapter, Refrigeration Contractors Association, under whose sponsorship the meeting was called, outlined the objectives of the assembly, citing a two-fold purpose: To outline a training program to bring new workers into the refrigeration industry; and to obtain information on available manpower and needs on which to base the trainee plan.

Ben Barnard, California chief of Training Within Industry branch of the War Manpower Commission, outlined four points which he regards as essential to a training program for the industry:

1. A program of basic training for new workers which it is essential to bring into refrigeration.

2. Additions to the basic training courses in the form of higher instruction in commercial installation work.

3. More complete courses for refrigeration journeymen so enable them to advance to more important tasks.

4. A program of supervisor training for foremen, instructing them in techniques for training men serving under them.

Questionnaires were distributed at the close of the meeting seeking information on the volume of work handled by contractors and service firms, the number of men currently employed, wage scales, number of untrained men available, number of men needed, and other pertinent data. The extent of the training program and the localities of training classes will be determined from the facts developed when the survey has been completed.

Oklahoma City, Okla.

Local refrigeration companies of Oklahoma City, Oklahoma, are starting their first class in refrigeration maintenance and repair, in cooperation with the WMC, as a free service to those interested in learning the trade, at the Okla. City Trade School. This is a three-week training course, and discharged veterans were especially urged to attend, Ralph Dunn, chairman of the training committee said. Upon completion of the three-week primary training course, trainees will be placed in jobs with the sponsoring companies and will attend advanced training in the evening to fit them for more skilled work.

Cincinnati, Ohio

A special school for training refrigeration repair men is to be conducted in Cincinnati under plans formulated by the Cincinnati

area of the War Manpower Commission and industry groups, John M. Baker, WMC director, disclosed March 30. E. J. Spicer of the C. M. Robinson Refrigeration Company is chairman of an emergency refrigeration service council formed to cooperate with W. J. Schilling, WMC training coordinator in meeting the industry's manpower problem. The council comprises three employers of refrigeration repair men and three refrigeration labor representatives. William B. Dickson, head of the Cincinnati public schools' war production training division is organizing the school.

Covington, Ky.

A course of training in refrigeration repair and service is now in progress at the Kenton County (Kentucky) Vocational School, Covington as a means to supply the critical need for repair and service men in this field. Robert Squair, who has been associated with refrigeration and air-conditioning industries is teaching the course to be conducted two nights a week. No tuition charge is being assessed, the school officials reported as the program is part of the training program for war industries.

Syracuse, N. Y.

A new course in the repair and maintenance of domestic and commercial electric refrigeration systems has begun at the Apprentice Training School in Syracuse, N. Y., to prevent Syracuse from becoming a critical area in this type of skilled labor, Dr. John F. Hummer, acting superintendent of schools, announced.

The classes have been established, according to Dr. Hummer, upon the direct request of Syracuse businessmen working as a committee with James F. O'Brien, training coordinator of the War Manpower Commission; Bernard O. Larsen, principal of Apprentice Training School, and Donald M. Kidd, Syracuse director of vocational education.

Classes for beginners start at 8:00 a.m. and run until 5:00 p.m. The classes are daily and continue for five weeks. Instructor for the class is Carlton J. Kresser who has had 15 years experience in the field of electrical refrigeration.

Additional classes have been arranged for men now engaged in electrical refrigeration work. This class is in session Monday, Wednesday and Friday from 7:00 to 10:00 p.m. and is under the direction of A. W. Snyder of the Gould Farmer Co.

Madison, Wis.

A course of instruction in refrigerator servicing and repair has been instituted at the Madison, Wis., vocational school under the sponsorship of the Madison emergency refrigeration service council made up of local refrigerator servicing firms. A standard plan for the course has been supplied by the National Refrigeration Service Council.

Madison firms engaged in the servicing of refrigerators have formed a permanent organization to sponsor the program. Officers are: Al Meinke, president; H. A. Struthers, vice-president; Mead Robertson, secretary; Fred Barney, treasurer.

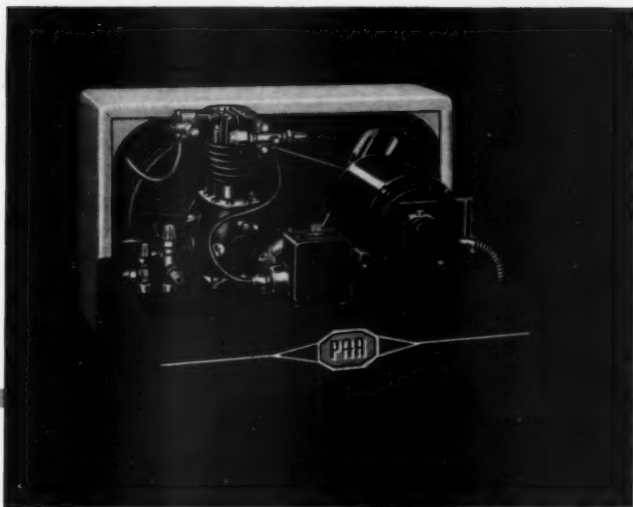
RETURNED VETERANS IN SERVICE WORK

MANY know that the 80,000 men being released each month by the armed forces are being re-employed through the United States Employment Service. To secure any of these men, however, it is necessary to call on the local U.S.E.S. office, tell the veterans employment official the story about the manpower situation in the refrigeration service field, and enlist his aid in securing men to carry on the work.

Unless this official is informed that refrigeration repairmen are on the list of critical occupations and that additional men are needed for this type of work in the community, he will probably refer returned veterans to other jobs he considers more essential to the war effort. The War Manpower Commission is counting on these veterans to fill in on many essential jobs but the refrigeration service field will secure few of them unless the needs of the situation are made known to U.S.E.S. offices locally.

WARNING ON CEILING PRICES

A WARNING has been issued to refrigerator dealers by Harry Canup, District Price Executive in Oklahoma City, against exceeding ceiling prices on used mechanical refrigerators. "We're having several complaints lately from buyers who think they have been overcharged," he said. "After we consult our charts on which are listed all models, types and sizes, if we find the seller has charged too much we advise the buyer that she is entitled to treble damages." Canup advised that consumer resistance to inflated prices is 90 per cent of the solution of price control.



Par Model HA-5

○ Just right for large display cases . . . small walk-ins . . . beer coolers . . . and reach-ins.

● A sturdy $\frac{1}{2}$ H. P. 2 cylinder air cooled condensing unit for self contained or remote applications.

● Embodies the 28 outstanding PAR features. Standard equipment includes controls.

● Write for illustrated brochure of details.

● BY COMPARISON—YOU'LL BUY PAR.

PAR *Division*

LYNCH

MANUFACTURING
CORPORATION
Defiance, Ohio, U.S.A.

WAR REGULATIONS

(Continued from page 26)

other purpose may be sold only on orders bearing a preference rating.

An old motor cannot be demanded by a dealer, wholesaler or motor agency for a new motor as part of the purchase price on an order bearing the AA-3 rating, it was pointed out.

Emphasis was placed on the repair of broken-down motors as quickly as possible because of the shortage of new motors for servicing refrigerators, oil burners and stokers, washing machines, water systems, etc., whose operation, WPB said, is important in maintaining civilian economy and morale.

Repair shops that are not equipped to rewind or repair motors may have this work done at motor repair stations in the local areas or by manufacturers who have established repair stations and replacement centers at centrally located points, or they may exchange broken-down motors for new ones at the manufacturers' stations. Some manufacturers will repair or exchange motors other than their own make at their repair and replacement centers. However, repair shop operators should ascertain from the manufacturers' local agency or factory that motors can be exchanged or repaired before they are sent to the repair station.

The motor repair situation has improved in the last few months, so all sources of repairs should be rechecked, if necessary, for possible improved service.

Every wholesaler, motor dealer or agency interested in having a small supply of fractional horsepower motors for resale to repair shops on rated orders was urged by WPB to file immediately a Form WPB-547 (formerly PD-1X) application. Although in the past it took five or six months for these orders to be filled, it is hoped, that this condition will improve.

NEW REFRIGERATORS PROMISED

BY the end of this year, according to a news letter of *McCall's Magazine*, new mechanical refrigerators and washing machines should be on sale in limited quantities. When they do appear, it is probable that they will cost somewhat more than the same models did before the war, because it costs a manufacturer more to make such products in relatively small batches.

ENGINEERS QUESTION CLAIMS OF "REFRIG-O-MASTER"

CLAIMS made for the "Refrig-O-Master," a box-like device designed for installation in a household refrigerator to increase refrigerating effect, have been questioned by a group of refrigeration engineers and at their request, Better Business Bureaus are conducting an investigation, according to a news report.

The makers claim that it will reduce running time, retard ice and frost formation, and maintain humidity equilibrium, thus keeping the refrigerator in operation longer and without service calls. However, refrigeration engineers say that some of the claims are opposed to known principles of refrigeration and that a laboratory test furnished by the distributor was condemned as being meaningless because of the methods used.

Members of the St. Louis section of the American Society of Refrigerating Engineers inaugurated the investigation and, according to the St. Louis Better Business Bureau, the National Better Business Bureau is cooperating with the Better Business Bureau of Los Angeles to conduct an investigation of the device.

At the request of the St. Louis Bureau, tests for current consumption were made by the Mechanical Engineering Department of Washington University and it was stated these tests proved that the device did not cut current consumption or reduce the operating cost. Additional tests are now being made to determine the effect upon moisture content.

THE QUESTION BOX

(Continued from page 31)

and valve to the extent that it clogs up the refrigerant passage. The other possibility is the location of the thermostatic bulb combined with the arrangement of the suction line.

Your letter has not stated whether or not the suction lines are tied together near the machine or near the Temprite cooler and walk-in cooler. I am wondering if it is possible that refrigerant from the water cooler is backing up through the suction line to such a degree that it is affecting the thermostatic bulb on the fin coil in the walk-in cooler. I note that you have a check valve in the line from the walk-in cooler, but it is possible that this valve is leaking.

IT'S TRUE!

You can manufacture many refrigeration products for civilian use

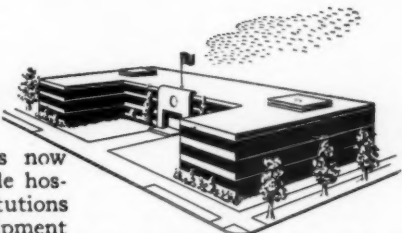
FARMS

With the recent relaxation of limiting orders on commercial refrigeration, the government has now made it possible to supply new equipment for certain essential uses.



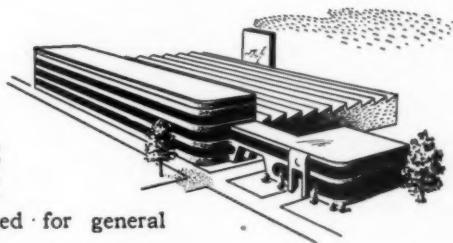
INSTITUTIONS

For example a dairy farmer is now eligible to buy milk coolers; while hospitals, hotels and all those institutions that require new refrigeration equipment for essential food preservation and many other uses can also purchase new units.



INDUSTRIAL PLANTS

Special processes employing refrigeration (many developed for and used only on war equipment) are now released for general industrial use.



The priority regulations are changing almost daily making materials available for previously "frozen" products. When your products are released, remember—Chieftain units are still the leader.



Chieftain

**TECUMSEH
PRODUCTS CO.
TECUMSEH • MICHIGAN**

Fifth Annual Canadian Refrigeration Conference Held at Toronto

THE fifth annual Canadian Refrigeration Conference sponsored by the Interprovincial Chapter was held in Toronto March 19 and 20. The Conference was a complete success with registrations hitting an all time high and the excellent program prepared by the Executive thoroughly enjoyed by all the members and their friends.

The meetings opened on Sunday morning with T. W. Savill, President of the Interprovincial Association officially opening the conference and welcoming the members and guests. Mr. Savill spoke of the sound and steady growth of the Interprovincial Association and expressed his appreciation of the interest and co-operation given the Interprovincial Chapter by the other provincial groups.

Ken Wood, past president of the Maple Leaf Chapter, spoke on the very interesting subject, "Are You Ready?" "Now is the time to prepare yourselves for the opportunities that will present themselves after victory is won," said the speaker who went on to explain that the service engineer was now considered an important and essential part of the war effort on the home front, stressing that those who may receive a call to the armed forces are entitled to consideration for deferment if their qualifications prove they are essential in maintaining refrigeration equipment in their own particular district.

Charter Is Presented

Following Mr. Wood's talk was an interesting ceremony conducted by John K. Bush, International Director of the R.S.E.S. who came to the conference especially to present the Charter to the Interprovincial Association. President Savill accepted it on behalf of the Association and thanked Mr. Bush for his kind interest in Canadian activities.

C. L. Olin of Servel Inc., discussed sub-zero refrigeration. He covered briefly the advance that had been made during the war period in developing equipment to maintain temperatures well below -50°F . Mr. Olin described the types of two and three stage condensing units that have been developed in order to produce temperatures as low

as -150° . A full report of Mr. Olin's talk will be published in a later issue of REFRIGERATION SERVICE ENGINEER.

Training Program

Warren Farr, International Director, gave an interesting talk on the United States manpower in training program. This training program, he said, has been found necessary because of the serious shortage of experienced servicemen and Washington had finally conceded that service engineers are essential and that more men must be trained in the art of service engineering. Mr. Farr told of the request by Washington to the National War Council to establish a National Refrigeration Service Man Power Committee. This committee was formed on August 30, 1943 and consists of 12 members and a chairman having geographical representation throughout the United States. "As a result," stated Mr. Farr, "this committee has 94 contemporary associations functioning in the United States and already 5,000 new members to the refrigeration service industry are now being trained for future requirements.

Irving A. Wilson of Superior Valve and Fittings gave a colorful description of his journey to East Africa to install and set up refrigeration equipment. Mr. Wilson covered in detail his experiences from the time he went on board ship in Charleston, South Carolina, until the time he reached the base in Cura, Eritrea. This colorful talk described the hardships, the excitement and the entertainment experienced on this rather eventful mission.

W. C. Kennedy representing the newly formed Canadian Refrigeration Manufacturers Association spoke on "The Serviceman's Place in the Canadian Refrigeration Industry." This speaker who knew his subject well, emphasized the importance of good service to the development and promotion of sales volume. The speaker pointed out the necessity of continual study of new applications so that the service engineer could fit himself into a prominent place in the postwar era.

Temprite ACCUMULATOR-INTERCHANGER IMPROVES..

.. OPERATION OF LOW TEMPERATURE INDUSTRIAL REFRIGERATION CABINETS *

Manufacturers of industrial refrigeration cabinets know that Temprite's Accumulator-Interchangers improve the operation of their low temperature refrigeration equipment.

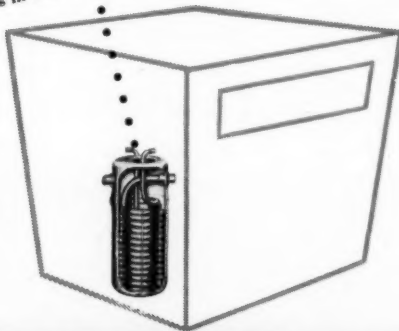
That is why Temprite's engineering staff is called on by many manufacturers at the start of new designs because they realize that, if best results are to be obtained, the accessory equipment must be incorporated in the basic unit.

This "Temprite Service" may be of value to you and your designers in the

application of standard accessories or where these standard items do not meet your exact requirements, in the design of special items for your individual problems.

If you have any present or postwar designing problems involving the use of heat exchangers, oil separators or temperature control valves, Temprite extends an invitation to you to call upon their staff of experienced refrigeration engineers—just write our sales department today and a meeting will be arranged at your convenience.

* Temprite Accumulator-Interchanger improves operation by: 1. Permitting one-hundred per cent of the evaporator coil surface to become effective because it eliminates any necessity for using a part of this coil as a drying agent for the refrigerant; 2. By eliminating return of liquid refrigerant to the compressor; crank case and the preventing formation of flash gas in the evaporator coil.



TEMPRITE PRODUCTS CORP.

Originators of Instantaneous



Liquid Cooling Devices

45 PIQUETTE AVENUE

DETROIT, MICHIGAN

F. Y. Carter, Detroit Lubricator Company, gave an informative address on "Refrigerant Controls for Low Temperature Application." The speaker explained that during the war period, low temperature refrigeration experiments had been conducted using Freon 12, Freon 22 and Propane refrigerants.

"While single stage compression systems are sometimes used in this low temperature work, it is generally necessary to use multiple stage compression or its equivalent at temperatures below -60° F. Two multiple stage systems, the multi-stage and the cascade, are in general use, he said.

G. E. Graff of Ranco Inc. spoke on "The Future for Refrigeration Service Engineers." Mr. Graff who has been associated with refrigeration service for many years kept his audience interested in a very timely discussion on the opportunities for service men after the war.

Officers and Directors

Officers and directors for the ensuing year were elected as follows: *President*, W. Marshall, Toronto; *Vice-President*, W. Sneath, Toronto; *Second Vice-President*, C. Pigeon, Montreal; *Secretary*, E. G. McCracken, Toronto; *Treasurer*, G. Condie, Toronto; *Sergeant-at-Arms*, A. J. Pike, St. John, N. B.

Board of Directors: Calgary Chapter, F. Dowling, J. Neilson; Nova Scotia Chapter, C. Tredwell, L. Mullinger; Forest City Chapter, London, W. Bevis, C. O. Cunningham; Mount Royal Chapter, Montreal, B. Lacerte, J. M. Turner; Maple Leaf Chapter, Toronto, R. O. Connell, J. McKee; New Brunswick Chapter, A. Laflamme, H. S. Perry; Capital City Chapter, Ottawa, H. Darragh, W. Podd; Winnipeg Chapter, T. L. Arnett, F. Chance.

N. C. Cooper of the Dupont Company, Wilmington, Del., delivered an interesting talk on "Substituting Refrigerants in Wartime." Mr. Cooper explained the shortage of Freon 12 and the uses to which it is being put by the armed forces in connection with aerosol, a pressure propelled insecticide which has been used successfully against all types of insects in the Far East and the Pacific areas of war. The speaker explained that several new plants are nearing completion that would supply additional quantities of Freon 12 but until these plants are in production it will still be necessary to use substitutes in order to keep essential refrigeration equipment in operation.

L. Larson of Tecumseh Products Corporation gave an interesting description of hermetic units. The speaker covered the development of sealed units and pointed out the importance of elaborate equipment to thoroughly dehydrate the system so that not the slightest trace of moisture remains to cause trouble. Mr. Larson suggested that in the near future when production of packaged commercial is permitted that units up to and including $\frac{1}{2}$ horsepower will probably be of the hermetic type.

George Wilson of Henry Valve Company, Chicago, gave a brief talk on "Dehydrators and Strainers and Their Application." Mr. Wilson pointed out the importance of having dryers of ample capacity properly installed to get the best uninterrupted service.

The speaker recommended that in estimating dryer capacity a rough calculation would be 12 to 15 cubic inches per horsepower unless an excessive amount of moisture has been introduced into the system. If such conditions exist it would be advisable to use an oversize service dryer temporarily for at least 24 hours of operation prior to the installation of a permanent dryer.

The final event on the program was an "Information Please" session conducted by H. S. Parish who had as the Board of Experts: Ken Newcum, Superior Valve & Fittings; W. C. Kennedy, Frigidaire Products; N. C. Cooper, R. J. Thompson, Dupont; F. Y. Carter, Detroit Lubricator; L. Larson, Tecumseh Products; G. E. Graff, Ranco; and Carl Heilig, Administrator of Refrigeration. The response of the members in supplying questions for this period was so great that many of the questions could not be answered during the period. It was arranged that the questions unanswered would be submitted to the experts for answers which will be published in the May issue of *Canadian Refrigeration Journal*.

The business session of the conference closed at 5:30 p. m. and at 7:00 o'clock the annual banquet and dance sponsored by the Maple Leaf Chapter of the R.S.E.S. were the final and closing features of a successful conference.

F. F. Schmidt
Okanogan, Wash.

Can't afford to miss the February issue, so I am sending my subscription for another year. It is the best information we can get out here away from where most machinery is manufactured.

"A Little Goes a Long Way!"

**THIS MUCH
THAWZONE**
(BY WEIGHT)



**FOR
THIS MUCH
REFRIGERANT**
(BY WEIGHT)

1 to 150

(in hermetic units

1 to 300)

To the service engineer who knows his refrigerating plants, the above is a graphic way of illustrating one of THAWZONE'S important features.

The 1-oz. bottle treats *8 lbs. of refrigerant.....	\$ 1.00
The 4-oz. bottle treats *32 lbs. of refrigerant.....	3.00
The pint bottle treats *128 lbs. of refrigerant.....	10.00

* This figure is doubled for hermetic units. See how little it costs to use.



A TINY AMOUNT → **A BIG JOB** ← SMALL COST



HIGHSIDE CHEMICALS COMPANY
195 VERONA AVE. NEWARK 4, N. J.

Refrigeration Service Engineers Society

Official Announcements of the activities of the International Society and Local Chapters appear in this department as well as articles pertaining to the educational work of the Society.



THE OBJECTS OF THE SOCIETY

To further the education and elevation of its members in the art and science of refrigeration engineering; for the reading and discussion of appropriate papers and lectures; the preparation and distribution among the membership of useful and practical information concerning the design, construction, operation and servicing of refrigerating machinery.

INTERNATIONAL HEADQUARTERS: 433-435 North Waller Ave., CHICAGO 44, ILL.

Service Engineers' Employment Bureau Is Organized by R.S.E.S.

THE Refrigeration Service Engineers Society has organized an employment bureau in its International Headquarters, designed to provide a needed service to the manufacturers of refrigeration equipment in their Post War planning and to aid members of the Society in obtaining sales and service contracts or agencies.

During the present war, many manufacturers service organizations have seriously broken down or become entirely lost due to the large scale shifting of service men to the armed forces and to war plants. After the war these manufacturers will find it necessary to obtain new sales and service outlets or to expand their present depleted organizations, all within a relatively short time. Then, too, there are many new manufacturers of packaged and specialty equipment coming into the field who will be desirous of obtaining contact with service companies with whom they can contract for their installations and service.

The educational programs of the Society in the past have kept its members well informed on the latest developments and methods in the refrigerating field. Its educational facilities will continue to keep them informed on all makes and applications of refrigeration, enabling them to represent any manufacturer. The Society feels, therefore, that its membership represents a ready-built sales and service organization well pre-

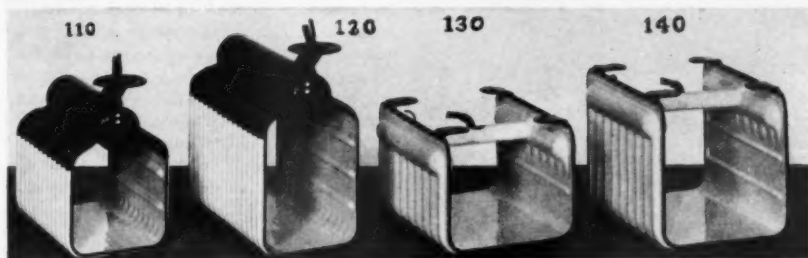
pared to serve the manufacturer in his Post War needs for sales and service outlets.

In view of the needs of the manufacturers and in order to render a greater service to its members, the Society has created "The Service Engineers Employment Bureau" in which all member service companies and contractors will be registered. Non-members are also invited to register, but members, of course, will be given preference in territory covered by them. At the same time a membership drive is being conducted for the purpose of increasing the territory covered by members and aimed at obtaining a member in every community of the United States and Canada.

Registrants in the bureau will be classified as to the kind of work they do, their sales facilities, service facilities, territory covered, etc. Upon request, then, manufacturers can be brought into contact with the service companies they require to handle their contracts or agencies.

The bureau will eventually be expanded to include the service engineer who is seeking employment with service companies, contractors, or manufacturers. It is hoped that through this service the men returning from the armed forces can be aided in finding the place they desire in the refrigeration industry. Employers will be asked at that time to cooperate by registering their needs with the bureau.

Used Evaporators and High Side Floats

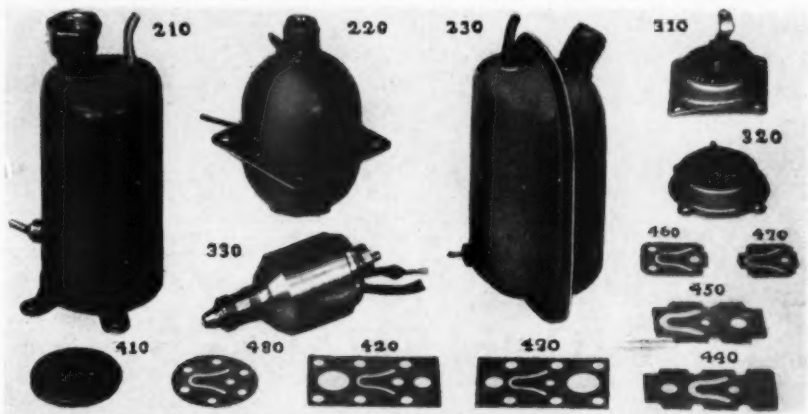


EVAPORATORS—FLOODED TYPE

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|----------------------------|--------------------------------|
| 110—2 Tray Goose Neck..... | 130—8½" w. 7½" h. 11½" d. |
| 120—3 Tray Goose Neck..... | 140—8½" w. 9½" h. 11½" d. |

\$6⁷⁵

Black, white and combination. On No. 110 and No. 120 leakproof lines \$2.50 extra



HIGH SIDE FLOATS *Cleaned and Checked*

- 210—For Westinghouse Units...
 220—Ball Type
 230—For back of refrigerators.

\$3²⁵

HAVE YOUR CROSLEY EVAPORATORS REPAIRED AND REPLATED LIKE NEW.....

\$14⁷⁵

USED GENUINE WESTINGHOUSE PARTS IN GOOD CONDITION

- | | |
|--------------------------------|------------------------------------|
| 310—Circuit Breaker@.75 | 410—Discharge Valve Plate.....@.75 |
| 320—Circuit Breaker@.75 | 420—430—440—450—Valves@.50 |
| 330—Unloader Valve\$1.50 | 460—470—480—Valves@.35 |

Porcelain Evaporators—Refinished Like New

Kelvinator, Gibson and All Others; Leaks Welded, Reporcelained in Blue. We have on hand certain models of evaporators to exchange—no waiting. Send in your old evaporator—Exchange Price, \$12.50. NOTICE—Remove all fittings and no evaporator will be accepted with any welds.

All Prices F.O.B. Chicago, Ill.

ACME REFRIGERATION PARTS CO.
 5217 W. Madison St. Telephone Columbus 4141 Chicago, Ill.

SERVICE ENGINEER

47

April, 1944

R.S.E.S. Chapter Notes

BOSTON CHAPTER

At the January meeting, officers for the new year were elected as follows: *President*, Bertil Stenmark; *First Vice-President*, Leslie W. Pierce; *Second Vice-President*, Wm. E. Jones; *Rec. Secretary*, John J. Madden; *Cor. Secretary*, M. P. Handspicker; *Treasurer*, Edward C. Hoyt; *Sergeant-at-Arms*, Charles Galli; *Chairman of Educational Committee*, James McCue; *Board of Directors*, Chester E. Borden, Harvey Patten and Austin Reynolds. Charles Harris gave a talk on the training program.

February 15—At the February meeting, the application of Chester M. Brown was approved and Mr. Brown was accepted as a member. A committee of four was appointed to handle the annual banquet consisting of Charles Harris, Chairman, C. E. Borden, M. P. Handspicker and James McCue.

A very interesting picture showing the processing and preparation of frozen foods for locker plants was presented by Mr. Bratton of Armstrong Cork Co.

March 14—President A. E. Alexander opened the March meeting and then turned the gavel over to the new President, Bertil Stenmark. The application of Robinson Witham was received and referred to the investigating committee. Mr. Handspicker reported on the banquet and ladies night which was scheduled for April 11. A sum of \$60.00 was voted to the banquet committee for entertainment.

Past President Lawrence J. Hall brought up the question of affiliation with the New England Engineers Society. Mr. Hall brought out that at a small cost, the Chapter could get some very good advertising and notices of different engineers meetings would be received by all members of the Chapter. Upon motion, a committee was appointed consisting of Mr. Hall and Mr. Stenmark to look into this question.

Charles Harris spoke on the question of adopting the Safety Code. After some discussion, it was moved to adopt the code with certain reservations.

A letter was read by Mr. Harris from Ollie Kent. Mr. Kent has been discharged from the service and is now in the refrigeration business in Texas. Mr. Harris also

TROUBLEMAKERS

Scale, Rust, Slime, etc., are thoroughly, safely, and economically removed by simply circulating NOBS CLEAN-OUT SOLVENTS.

Nobs specialized Solvents and Water Conditioners are used by manufacturers of cooling and refrigeration systems and by service men and operators.

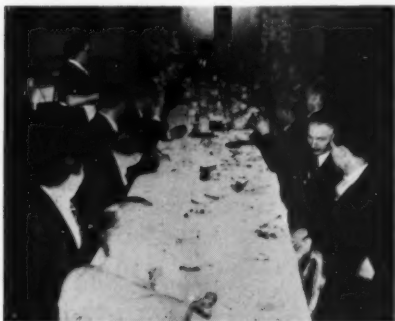
NOBS CHEMICAL COMPANY

2465 EAST 53rd STREET KIMBALL 9288 LOS ANGELES, CALIFORNIA

spoke on the training program and draft deferments. Many of those present were interested in this and Charlie was kept busy answering their questions.

BAY CITY CHAPTER

At a recent meeting of the Chapter, the members present were very much interested in the discussion of price control, O.P.A. rulings and regulations. Formation of a new Chapter for this territory was also discussed at some length.



View of a recent dinner meeting, Bay City Chapter



Another snapshot taken at recent meeting of Bay City Chapter

MILE HIGH CHAPTER

March 13—The meeting was attended by twenty-five members and two visitors. The only outstanding committee report was presented by the membership committee which had been asked to make a study of attendance at meetings and to suggest ways of increasing the attendance with the possibility of awarding R.S.E.S. lapel buttons as prizes. The committee consisting of Messrs. Hemphil, Land and Smith offered several sug-

DEPENDABLE



TYPE WL

TYPES WP AND WL PRESSURE ACTUATED CONDENSING WATER REGULATORS

Individually tested for efficient operation—these valves may be mounted in any position and will give dependable, trouble-free performance. Brass body, two ply power bellows, and corrosion resistant materials for all parts. WL valves are available in $\frac{3}{8}$ inch FPT and WP valves in $\frac{3}{8}$, $\frac{1}{2}$, and $\frac{3}{4}$ inch FPT.

WRITE FOR A COPY OF
OUR LATEST CATALOG.

Electromatic

2100 INDIANA AVE.
CHICAGO 16

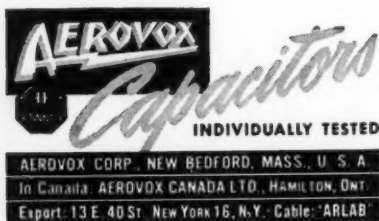


TYPE WP



VICTORY. REPLACEMENTS

● The Aerovox Victory Line of 30 universal types can take care of upwards of 90% of all motor-starting capacitor replacements. Handy Aerovox conversion chart indicates Victory equivalent for any previously available type. ● Ask your jobber about these Aerovox Victory replacements. Ask to see the Aerovox conversion chart. ● Or write us direct.



gestions. After some discussion it was decided to award buttons to those signing up new members.

The application of Donald E. Nauman was presented to the membership committee and he was elected as an active member.

Mr. McCombs brought out that the Denver Emergency Refrigeration Service Council does not have a representative of labor on its board and suggested that such a representative be elected. Robert West was elected.

CORN BELT CHAPTER

March 15—The fifteenth meeting of the Corn Belt Chapter was held at Hotel Rogers. A second reading of the Constitution and By-Laws was made and no changes were recommended. A very interesting talk was given by R. L. Hendrickson on low temperature insulating in which he pointed out many of the problems encountered in the vapor-proofing of a wall and the proper methods of overcoming these problems.

WYOMING VALLEY CHAPTER

February 14—President Harris read a paper from National Headquarters on ideas for Chapter meetings. This was followed by a paper on the war manpower training program for the refrigeration industry, read by Mr. Brownley of the Luzerne County Gas and Electric Co. Following a lengthy discussion of this program, C. E. Luft was elected First Coordinator and committees were elected to carry out the program.

March 13—At the March meeting, a membership committee submitted the name of Ben Geisten as an associate member. A letter from Jack Cusick was read by Mr. Price. Several letters were read by the President from the National War Manpower Training Committee, after which a motion was made that a credit rating list of customers be presented by each member to be compiled into a master list.

Sound motion pictures of the Bell Telephone and General Motors Co. were presented by Mr. Reese.

SAN DIEGO CHAPTER

March 9—Seventeen members and two guests were present at this meeting. After a short business session, President Friedrichs read and commented on the recent section of the lecture course covering water cooled condensers. This was followed by an open forum in which the subject was discussed by members and some very interesting pointers were brought out.

This Chapter as well as the National Society has been getting some very favorable publicity through the San Diego Committee Bureau of radio and electrical appliances, whose members include nearly all of the refrigeration dealers in the section. At present, several of the members, who also belong to the bureau are on a committee which is meeting with the local War Production and War Manpower Boards.

TOLEDO CHAPTER

March 8—At the March meeting, the Question Box was revived which proved very interesting with Mr. Hudson furnishing much of the information. The films "Sand and Flame," "Working Together" and "Victory Is Our Business" from the General Motors Corporation consisted of 45 minutes on education and entertainment. The letter on the new membership drive was read, listing names of six prospects.

CENTRAL CONNECTICUT CHAPTER

March 2—The third annual banquet of the Central Connecticut Chapter was held Thursday evening, March 2, at the Empire Room of the Empire Restaurant, Hartford, Conn. Sixty-two members, friends and guests enjoyed a steak dinner including all the trimmings, with wine served as an appetizer and fancy paper hats to add color to the affair. Bob Steele, WTIC radio commentator was the guest speaker and his wit and humor was a real treat. Lew Katz acted as master of ceremonies and his performances surely had the boys all rocking in their chairs.

Chief Boatswain's Mate Schaperow, member of the local Chapter, who has served 34 years in the Navy and who has a unique collection of decorations and is still on active service at the New London submarine base was given a big ovation. Sgt. Tom Walker recently returned from the Pacific area carrying service bars aplenty with four major battle decorations also received a royal welcome.

Newly elected officers for 1944 were installed as follows: *President*, Arthur Andreen; *First Vice-President*, L. Guertin; *Second Vice-President*, J. Paull; *Secretary*, J. Felix; *Treasurer*, J. Paar; *Sergeant-at-Arms*, E. Logan. Most of the officers were just reshuffled (Washington style) from 1943 and the progress the Chapter makes during 1944 should prove equally as good as 1943. Application blanks were distributed at the banquet, and new members should be forthcoming in the near future.

DON'T RISK HIDDEN REFRIGERANT LEAKS

VISOLEAK SHOWS THEM UP

Save

TIME MONEY REFRIGERANT

VISOLEAK keeps a ceaseless vigil for those hard-to-find leaks which have always been the Refrigeration Engineer's headache.

VISOLEAK is a finely-treated colored refrigerant oil which penetrates every nook and cranny of the system. The leak is indicated by a red stain — just like the discoloration on a carburetor in which ethyl gasoline has been used. Can be used *safely* and *effectively* with any type of refrigerant.

VISOLEAK is economical.

Wholesale Prices		Save 10% on case lots
4 ounce bottle	\$1.00	48 bottles
8 ounce bottle	1.75	24 bottles
1 pint bottle	3.00	24 bottles
1 quart bottle	5.00	12 bottles
1 gallon can	16.00	6 cans

See your jobber or write for complete information

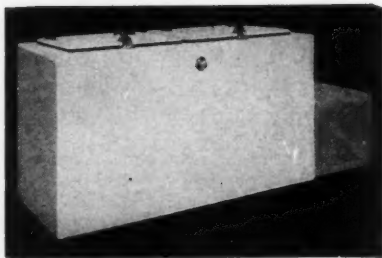
WESTERN THERMAL EQUIPMENT COMPANY
5141 Angeles Vista Blvd., Los Angeles 43, Cal.

Please send me complete details about **VISOLEAK**.

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SANITARY Quicfrez



Model illustrated—No. C-1243
Capacity, 12.5 net cu. ft.
Holds up to 600 lbs. of frozen food

FARM LOCKER PLANTS . . .

Long before Pearl Harbor, thousands of farmers were already proving the rich benefits of the **SANITARY QUICFREZ** for freezing and keeping all farm-grown meats, poultry, game, vegetables, fruits. They are saving food, time, transportation, and enjoying year 'round food variety, and a more healthful diet.

Sanitary dealers will not have to wait for engineering developments. They will be ready when production is permitted—with a product backed by a company already nationally recognized as one of the leaders in this field.

Sanitary Refrigerator Co.
Fond du Lac, Wisconsin



MONUMENTAL CHAPTER

At a recent meeting, John Weisman of the Frigidaire Corp. was introduced and gave a very interesting talk on the refrigerator training program sponsored by the War Manpower Commission. His talk was received with great enthusiasm by the members and it was decided that the Chapter would give its full support to the War Manpower training program.

ST. LOUIS CHAPTER

February 10—President Fix opened the meeting by announcing that the chicken dinner that was to be served could be relished by those present without the fear of any business interfering. Most men, he thought, can think better on a full stomach and he hoped that the business session would have a more vigorous touch. After dinner, new officers were elected for 1944 as follows: *President*, Edgar A. Weber; *Vice-President*, Adolph Braun; *Secretary-Treasurer*, L. L. Vollman; *Sergeant-at-Arms*, H. B. Menaugh; *Board of Directors*, E. C. Fix, Geo. E. Becker and S. N. Mohler.

Following the election, Mr. Fix turned the gavel over to the new President with the best wishes for good luck.

The "Battle for Russia" was shown and Theodore Rumpf had his recording device going and some very good recordings were made at this meeting.

TWIN CITIES CHAPTER

March 7—Reporting for the entertainment committee, Russ Hoppenrath announced plans for a dance during the month of April. Henry Sundgaard and Fred Phillips were appointed to help the committee. Art Palen, Joe Parupsky and George Klahn were appointed on the membership committee. The obligation of the Society was read to four new members: Earl Sigafos, Fred Phillips, Ubert Hanson and Russ Hoppenrath. Two new applications were received; Irven Larson was accepted for active membership and Rolfe Tisher was accepted for associate membership.

Following the business meeting, a service clinic was presented by President McCafferty.

KANSAS CITY CHAPTER

February 1—Application for G. L. Easley for associate membership was presented, approved and accepted. An article from the National Society on the shortage of manpower was reviewed and discussed by Mr. Visger. As chairman of the educational committee, Mr. Schreiber, First Vice-Presi-

dent, appointed G. E. Tribble and R. E. Meeker as members of the educational committee. C. L. Hataway and E. L. Tramposh were named to assist Mr. Ferguson on the membership and entertainment committee.

The educational session was conducted by Mr. Schreiber who gave a very interesting talk on changing Freon installation to methyl. A lively discussion followed.

MAGNOLIA STATE CHAPTER

February 23—An educational meeting was held with thirteen members present. Membership applications were received from Ellis Lord, W. B. Nelson and Dick Carman. L. B. Brummett presented a suggestion for newspaper publicity including feature stories and small advertisements. Definite action was deferred until the following meeting.

The care of V-belts was discussed by S. M. Sansing and the subject of lapping plates and seals was discussed by Charles Bowron.

Plans were approved to make the next meeting, March 8, a social meeting and an invitation was extended to meet at the plant of the G. E. Supply Corporation where Mr. Nelson promised to prepare a buffet supper.

DAYTON CHAPTER

March 9—The educational portion of the March 9 meeting held at Allied Parts Co. consisted of the problems of the service men, which brought up some very interesting questions and much valuable information.

NIAGARA FRONTIER CHAPTER

February 12—An open meeting was held at the B-19 Air Raid Warden Headquarters at 9.00 P.M. An application for membership was received from Bernard Petrille. John Bush gave a talk on the educational program sent out by the national training committee and told what they were doing under this program in Lockport. For the educational program, John Bush told how he has converted milk coolers to deep freezers holding a temperature of 10° F.

March 10—An open meeting was held at the home of William Goeckel, 64 Herkimer St., Buffalo. Applications for membership were received from Henry Kotecki and Bernard Petrille and approved. A letter on the new membership drive received from the National office was read by Mr. Bush. It was decided to have very members on the committee and a list of prospective members sent to Chicago. The problem of returning service men and the probable effect on the refrigeration industry was discussed.



DON'T LET THE EXTRA PROFITS GET AWAY

THEY won't if you have in your truck a supply of



**THE REPLACEMENT GAS
for METER-MISERS**

HERVEEN, the modern replacement gas for servicing Frigidaire Meter-Misers, saves call-backs, thus conserving precious gas, rubber and time.

With **HERVEEN** a service man can handle many more calls during these busy days. By so doing he increases his profits.

HERVEEN is reliable, safe and satisfactory in performance. Most jobbers stock **HERVEEN**, but if yours doesn't, write direct to

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Manufacturers and Refiners

1084 Bedford Ave., Brooklyn 5, N.Y.

Are You in a Spot for Lack of Equipment?



A Corner of our Madison Avenue Display Floor

In this period of equipment scarcity the New York market affords the best source of supply for refrigeration equipment. Complete Refrigerator Supply is in a position to offer you reconditioned equipment without restriction and new equipment for properly extended priorities.

Available from our large stocks are frosted food cabinets, farm freezers, reach in cabinets, display cases, condensing units, coils, valves, tubing, etc. Also job lots of refrigerating equipment of all types.

We suggest you write us about any of your requirements. We will gladly act as your New York source of supply and buying agents.

Complete Refrigerator Supply

Main Office & Showroom

95 Madison Avenue, New York 16, N. Y.

Telephone: Lexington 2-5167-3

Ladies Auxiliary

NIAGARA FRONTIER AUXILIARY

January 14—The January meeting was held at the home of Mrs. Ralph Davis. Officers for the coming year were elected as follows: *President*, Mrs. John Muller; *Vice-President*, Mrs. Walter Bobzien; *Secretary-Treasurer*, Mrs. A. H. Keirn; *Sergeant-at-Arms*, Mrs. Ralph Davis. At the February 11 meeting, plans for the banquet and future installation of officers were discussed.

March 10—Three applications for new members were accepted: Mrs. Bert Miller, Mrs. Ed. Orsolits and Mrs. Bernard Pettrille. Tentative plans for the trip to the R.S.E.S. convention to be held in Toronto, Ont., March 19, were discussed. A gift for the Davis baby was discussed and Mrs. Goeckel and Mrs. Keirn were chosen to select the gift.

KANSAS CITY AUXILIARY

February 2—Annual reports of the Secretary and Treasurer for 1943 were read and approved. The retiring President, Mrs. Visger, expressed appreciation to the officers and members for their cooperation during the past year and presented the auxiliary with a gavel as a mark of appreciation.

Letters of thanks for fruit cakes sent at Christmas time were received from Berry Allen stationed in the southwest Pacific and from Sgt. A. M. Hoover in Louisiana. Sgt. Hoover also expressed appreciation for the card carrying the names of those attending the Christmas party. A card of thanks from Lila Mae Luebke for hose sent at Christmas time was received. Mrs. Wilma Smith was instructed by the President to purchase cards to be sent to members' husbands on their birthdays. She was also instructed to see that all guests and members were properly introduced each meeting night.

Mrs. H. L. Ward was elected Vice-President, taking the place of Mrs. Cooper who resigned, and named as her assistants on the entertainment committee, Mrs. L. A. Mendenhall and Mrs. C. L. Hataway.

TWIN CITIES AUXILIARY

March 7—Following the discussion of a local constitution, the four officers, Mmes. Chermak, Klahn, Holmes and Ost were instructed to get together and draw up a constitution to be presented at the following meeting. A series of card parties were planned for which members of the Chapter will be asked to help.



Have YOU Tried AIRO SUPPLY Lately?

Next time you "talk shop" with another Service Engineer, be prepared for that question! He and plenty more like him in all parts of the country have found out through personal experience that the AIRO slogan means what it says:

"You'll Like to Buy from AIRO Supply."

And that goes for you, too—wherever you're located. Send for your copy of the AIRO VICTORY Catalog, now.

AIRO SUPPLY CO., Wholesale Distributors

Dept. A, 2732 N. Ashland Ave., Chicago 14, Ill. Refrigeration Parts, Equipment, and Supplies

LAWSON NAMED VICE-PRESIDENT NASH-KELVINATOR CORP.

THE appointment of Charles T. Lawson, general sales manager of the Kelvinator Division, as a vice-president of the Nash-Kelvinator Corp., has been announced by George W. Mason, president. As vice-president in charge of sales for the Kelvinator Division, Mr. Lawson's broadened responsibilities, according to Mr. Mason, will better enable him to plan and execute a program of expansion for Kelvinator in the major appliance field. This is in keeping with the company's recent announcement that Kelvinator expects to exceed a million units during the first year of peacetime production.

Mr. Lawson has been with Kelvinator since 1939. Prior to that time, since 1932 he had been an official of Frigidaire, becoming household sales manager in 1934. He was general sales manager of the General Motors Radio Corp. in Dayton, Ohio, for three years prior to 1932. During the last war he served as a captain in the Second Division Marines, A.E.F. Following the war, he was associated with the Westinghouse Co. until 1921, leaving there to become general sales



CHARLES T. LAWSON
Nash-Kelvinator Corp.

manager and later vice-president of the Day San Electric Co., Dayton, Ohio. Early in the war he participated in the company's extensive war production program. A native of Virginia, he holds degrees in both mechanical and electrical engineering from Virginia Polytechnic Institute.

SERVEL VETERANS

War shortages have proved the exceptional durability of Servel Commercial Condensing Units. Thousands of Units from ten to twenty years old are cheerfully serving "a re-enlistment" for the duration—thanks to original quality and intelligent service. Insist on genuine Servel parts.

SERVEL, Inc.

Electric Refrigeration and Air Conditioning Division
Evansville 20, Indiana

MIDDLE ATLANTIC JOBBERS HOLD OUTSTANDING MEETING

A WELL attended and quite successful meeting of the Middle Atlantic Refrigeration Supply Jobbers Association was held at the Continental Hotel, Washington, D. C. on March 6. The first part of the session from 1:00 to 3:00 p. m. was closed, but from 3:00 to 9:00 p. m. it was open and nearly twenty of the manufacturers' representatives from that section were present.

There was a full attendance of the Middle Atlantic Group except those from Pittsburgh where a similar meeting had been scheduled later. Vice-President Small of St. Paul, Minn., and past president Holcombe of Philadelphia were in charge of the joint meeting and a number of very pertinent and timely questions relative to jobber and manufacturer relations, both present and past, were generally discussed, and some very interesting and quite satisfactory definitions were arrived at.

This was the first meeting of the Middle Atlantic Group to which manufacturers and their representatives had been invited, and it was the consensus of opinion that it should be an annual affair.

MITCHELL JOINS CHASE CO.

THE Chase Refrigeration Supply Co., Chicago, Ill., announces that R. B. Mitchell, formerly with the Johnsen Refrigeration Company, Chicago, is now associated with the company. Mr. Mitchell has in past years, prior to his affiliation with Johnsen Refrigeration Company, worked for two well known Chicago refrigeration supply jobbers. His broad experience will be available in keeping customers supplied with the latest trade information as well as the latest types of all supplies.

JOBBERS ASSOCIATIONS MEET

A MEETING of the Midwest Refrigeration Supply Jobbers Association will be held at the Stevens Hotel, Chicago, Ill., Tuesday evening, April 25. The meeting will start at 7:30 p.m.

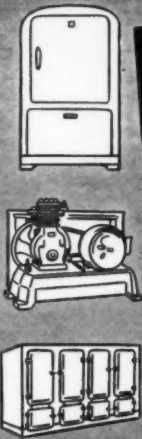
A three-day closed meeting of the National Refrigeration Supply Jobbers Association has been announced to be held at the Stevens Hotel, Chicago, starting Monday, April 24.



A FEW PICTURES TAKEN AT THE MIDDLE ATLANTIC MEETING

Top row, left to right: H. W. Small, vice-pres., N.R.S.J.A., The Thermal Co., St. Paul, Minn.; Harry Klinger, Kramer Trenton Co.; Alex Holcomb, past president, N.R.S.J.A., Victor Sales, Philadelphia; on right: Frank Purtell, M & E Refrigeration Accessories Co., Philadelphia; Charles Logan, past president, A.S.R.E., Superior Valve & Fitting, Pittsburgh; Alex Holcomb, Victor Sales, Philadelphia; W. F. Carmody, Spoehrer-Lange Co.; Major (Chuck) Seacrist, formerly with Spoehrer-Lange Co., now with U. S. Army Air Forces, Washington, D. C.

Bottom row, left to right: Oscar Larson, president, and Geo. W. Booth, secretary, Middle Atlantic Group; "Matt" Oberholzer, L. H. Gilmer Co., Philadelphia; Bob Bruce, Baltimore; "Shorty" Hale, Noland Co., Norfolk, Va.; Wm. Juschlag, Elect. Warehouse, Philadelphia; Russell Jones, Ref. Sup. Co., Harrisburg, Pa.; Parker Leinbach, Baltimore Ref. Sup. Co., Baltimore, Md.; George Roche, Parks & Hull, Baltimore, Md.



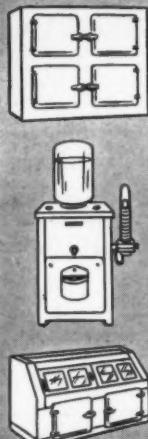
FOR ALL TYPES OF REFRIGERATORS

ANSUL

ICE-X
TRADE MARK REG. U.S. PAT. OFF.

ICE-X quickly cures emergency freeze ups when ice forms at the expansion valve or capillary tube. Harmless to use. Great for Freon, Carrene, or Methyl Chloride systems... The dependable liquid anti-freeze.

ORDER FROM YOUR JOBBER OR—



THE HARRY ALTER CO. 1728 S. MICHIGAN AVE. CHICAGO 16, ILLINOIS

JOBBER: WRITE FOR SPECIAL PROPOSITION!

NOW! DAY AND NIGHT WATER COOLERS FOR WAR PLANTS AND INDUSTRIAL CAFETERIAS



Now they can be sold!
Day and Night glass filter coolers for industrial cafeterias; bubbler coolers for war plants.

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WRITE FOR LATEST DATA

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FRED C. KRAMER COMPANY

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Tel. Haymarket 0555

NEW SOLDERLESS WIRING

A NEW method of solderless wiring, employing simple devices which even unskilled workers can quickly master, promises to make obsolete the old-fashioned soldering iron in making terminal connections. The method, engineered by Aircraft-Marine Products, Inc., of Harrisburg, Pa., is already in wide use in war industries.

Instead of the conventional soldering iron, solder and flux, the worker needs only a hand tool resembling a pair of pliers. With this he has his choice of a wide variety of terminal connections to fit the job. Pressure on the handles of the tool crimps the terminal connections in such a way that a perfect connection results without the necessity for heat. For quantity operation, press dies are available.

Tests on terminal connections made by this method have shown uniformly excellent results from the standpoint of tensile strength, voltage loss and resistance to corrosion. An important reason for this is the fact that the method of crimping the strands of wire make the terminal and the wire one homogenous mass. This in turn seals the wire against accelerated corrosion.

Besides making it possible for new workers to turn out foolproof terminal connections, even with the small wire used in such delicate apparatus as electronic instruments, solderless wiring has another important advantage in that it can be employed in cramped places where ordinary soldering is difficult if not impossible.

EHMAN NAMED ASSISTANT RESEARCH DIRECTOR

PHILIP J. EHMEN, a research chemist with Ansul Chemical Company, Marinette, Wisconsin, for the past eight years, has been named Assistant Research Director, according to announcement made by H. V. Higley, the firm's president. The appointment took effect February 7. Dr. Walter O. Walker is Director of Research and Development at Ansul.

Mr. Ehmman, born and reared in Montana, received his Bachelor of Science degree in 1932 at the age of twenty from Montana State College and three years later earned his Ph.D. degree at the University of Chicago. He joined the Ansul research staff in May, 1936.

STANGARD

Prime Surface

COLD PLATES

Maximum Refrigeration Efficiency

THE STANGARD-DICKERSON CORP.

46-76 OLIVER STREET, NEWARK, NEW JERSEY

OUR NEW 1944 REFRIGERATION PARTS CATALOGUE WILL BE READY APRIL 1ST.

Write for your copy.

Our South
Side Branch,
809 W. 74th
St., Chicago,
has a complete
stock for your
convenience.

Automatic
HEATING & COOLING SUPPLY CO.

647 WEST LAKE STREET, CHICAGO, ILLINOIS

The parts
you need
are in our
stock.

GENERAL CONTROLS OPENS BRANCH OFFICE IN ATLANTA

OPENING of a new branch office at 376 Nelson St., S.W., Atlanta 3, Georgia, is announced by General Controls Co., Glendale 1, California, manufacturers of pressure, temperate and flow controls. Com-



ROGER W. ALLEN
General Controls Co.

plete factory sales and service to customers in Atlanta are under the direction of Branch Manager Roger W. Allen.

Mr. Allen was born in Atlanta in 1904 and is well and favorably known throughout the South. He is a graduate electrical engineer, educated at M.I. T. and Georgia Tech, and has had an unusually broad sales and service experience in the related instruments and control industry. Specializing in technical and industrial sales he covered the southern states for fourteen years.

\$\$\$

NEW G.E. SERVICE CENTER

ESTABLISHMENT of a factory-operated Newark appliance service center at 85 Main Street, West Orange, N. J., effective March 1 has been announced by L. H. Taylor, manager of Product Service for the Appliance and Merchandise Department of General Electric Company.

The service center will take over the service activities on G-E refrigerators, and other appliances formerly handled by the Philip H. Harrison Company. The Harrison Company will continue as distributors of commercial refrigeration equipment.

Curco
Refrigeration
PARTS
REC'D

1374 WEST
NOTRE DAME

DAY SERVICE

IF YOU ARE LOCATED
in Canada

MONTREAL

SERVICE ENGINEER

EXPANSION VALVES

Rebuilt or Exchanged

Automatic (any make).....	\$1.50
Thermostatic (any make).....	\$3.00
Water valves	\$2.50

COLD CONTROLS

Domestic	\$2.25
Commercial (low or pressure).....	\$2.50
Commercial (high & low).....	\$3.25

All prices F. O. B. Chicago

All work done on money back guarantee.
(All fittings must accompany order)

REFRIGERATION SURPLUS DEALERS

2209 N. Karlov Ave.

Chicago 30, IL.

CONTROL REPAIR SERVICE

Because of the shortage of materials, 1944 will be a very busy one for the Service Engineers. Fewer replacement parts will be available, necessitating more repairs.

Why not send your control jobs to us? We recondition controls equal to new at a small cost. All our work guaranteed for one year. Prices on request.

UNITED SPEEDOMETER REPAIR CO.

342 West 70th Street
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MAYFLOWER

UNITS AND PARTS

COMPLETE stocks of genuine Mayflower Condensing Units and Parts. Service men, consult your jobbers, or write us direct. Jobbers, we solicit your inquiries.



**MAYFLOWER
PRODUCTS, Inc.**
13 S. 5th St.
Richmond, Ind.

JARROW REPLACEMENT DOOR GASKETS

Your customers will always be satisfied with a JARROW gasket. Odorless and grease resistant.

INSIST
UPON
JARROW

JARROW PRODUCTS
420 North La Salle St.
Chicago, Ill.

JOHN SCHENK NOW APPLICATION ENGINEER FOR ALCO VALVE

JOHN A. SCHENK, of the Alco Valve Co., St. Louis, former Chicago district manager, but for the last two years handling priority material allotments and production coordination at the St. Louis plant, has been appointed application engineer. His duties will lie mainly in the field and will embrace problems of design and application encountered by the users of Alco products.



JOHN A. SCHENK
Alco Valve Co.

He has been with Alco since January, 1935. After spending a year in the engineering department on research and design, he managed the company's Chicago office until it was closed by the war in April, 1942.

Mr. Schenk is a member of the A.S.R.E., and active in refrigeration circles throughout the Chicago and St. Louis areas. He graduated in electric engineering at the University of Detroit.

\$\$\$

LYNCH CORPORATION REPORT

THE annual report to stockholders has been issued by the Lynch Corporation of Anderson, Ind., covering consolidated figures for Lynch Corp. and its wholly owned subsidiary, the Lynch Manufacturing Corp. at Toledo, Ohio, and Defiance, Ohio. The report shows net earnings slightly above revised figures for the previous year and well above the dividend paid of \$2.00 per share. Sales again reached a new all time high, with war work accounting for a substantial portion of the volume.

GENERAL ELECTRIC BRANCHES

TWO new wholesale distributing branches have been established in Cincinnati and St. Louis by the General Electric Company, it has been announced by H. L. Andrews, vice-president in charge of the company's Appliance and Merchandise department with headquarters in Bridgeport.

The branches, which began operations officially April 1, will provide for the wholesale distribution of General Electric household refrigerators and other equipment. The branch in Cincinnati will be responsible for the distribution of these products in both the Cincinnati and Dayton wholesale areas.

Paul C. Wilmore has been appointed branch manager with headquarters at 215 West Third Street, Cincinnati. Previously he had represented G-E on the Pacific Coast with offices in San Francisco. While there he was a representative of the household refrigeration and publicity divisions.

The St. Louis branch will cover the city's wholesale area and will be under the management of G. R. Brownback, who has been on the staff of the G-E office in Washington. His new headquarters will be at 500 North Beaumont Avenue, St. Louis.

\$\$\$

NEW CATALOGS AND BULLETINS

THE HARRY ALTER Co. is issuing a new 1944 catalog on refrigeration and air conditioning parts, supplies, and equipment which is ready for distribution now. It contains an up-to-date listing of available merchandise together with latest priority information. Dealers are advised that many items can now be supplied, which were very scarce or not available at all until this time.

It is the intention of the WPB that servicemen should look ahead and be prepared with the necessary stock of parts for the spring and summer rush. Inventory restrictions have become more liberalized and sources of supply have been replenished regularly due to increased allotment of critical material to the manufacturer. This 1944 catalog No. 139 also lists eleven pages of close-out merchandise, some items of which are not manufactured at the present time.

This is the first complete catalog published for some time, as the company was forced by circumstances to confine itself to supplements only, listing only parts of the stock. This 1944 catalog No. 139 will be mailed free on request to any serviceman. The request should be made on letterhead or accompanied by some kind of identification.

SERVICE ENGINEER



To Grow BIGGER—

More and more men already "in" refrigeration are finding out that to grow **BIGGER** in this fast-moving field you have to have training. That's why so many of them are enrolled with U.E.I.—now in its 18th year of training men for **BIGGER JOBS** in refrigeration and air conditioning. Write for free details about how you can get this training in your **SPARE TIME.**

UTILITIES

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1314 W. Belden, Dept. 45, Chicago 14, Ill.

QUICK SERVICE

Place Your Orders Now—No Waiting

Either at our counters or for shipment—large stock of all refrigeration supplies.

CHASE REFRIGERATION SUPPLY CO.

546 West 119th St. Chicago 28, Ill.
Phone: Pullman 5125

AUTOMATIC EXPANSION VALVES

repaired or exchanged
at \$1.75 F.O.B. Chicago



Until further notice we will be unable to accept other types of repair work.

ALL WORK GUARANTEED FOR 90 DAYS

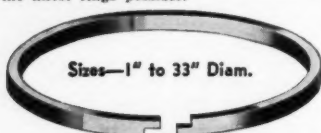
NEW DUTY

2424 Irving Park Blvd., CHICAGO 18

AUTO-DIESEL LADLE TEMPERED PISTON RINGS

Since 1921

For nearly a quarter of a century AUTO-DIESEL "Ladle Tempered" Piston Rings have been giving satisfactory service to many in all parts of the country. Our organization is made up of men who spent years making AUTO-DIESEL Piston Rings and are constantly striving to turn out rings of the finest quality. We know that the reason so many have standardized on AUTO-DIESEL Piston Rings and order them year after year is because of the effort our men have made down through the years to turn out the finest rings possible.



Write for information
THE AUTO-DIESEL PISTON RING CO.
3157 Superior Ave. CLEVELAND 14, OHIO

QUALITY RINGS SINCE 1921

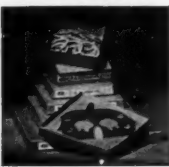
**GET READY FOR THE RUSH!
HOOK UP NOW WITH A JOBBER
WHO IS DEPENDABLE**

WITH warm weather the going will become really tough. Fewer men, you know, to do more work. But with a good dependable jobber to furnish replacements and materials, much of your problem will be solved. Make your arrangement **now**.

AS ALWAYS DEPEND on BLYTHE
H.W. BLYTHE CO., 2334 South Michigan Avenue, CHICAGO 16

GASKETS

SPEED VICTORY



• Until Victory is won, war orders come first. Today, our gasket service for every refrigeration need is helping speed war production. Under these conditions, delays in filling other orders are unavoidable.

Write for complete catalog.

CHICAGO-WILCOX MFG. CO.
7701 Avalon Ave. Chicago 19, Illinois

**HERE IT IS NEW
WILL BE READY
APRIL 15th CATALOG**

**ANNOUNCING NEW LINE
WASHING MACHINE
PARTS AND SUPPLIES**

**MOTOR PARTS
DELCO—SUNLIGHT
WAGNER**

**REFRIGERATION
PARTS AND SUPPLIES**

100% WHOLESALE

**REFRIGERATION
HERMETIC REBUILDING
GRUNOW—MAJESTIC
GENERAL ELECTRIC
WESTINGHOUSE**

SERVICE PARTS CO.
2511 LAKE ST. MELROSE PARK, ILL.

**WEST COAST
CONTROL SERVICE**

Cold Controls • Pressure Switches

**One year guarantee
on all repairs**

Original Factory Specifications

UTILITY THERMOSTAT CO.
4011 Halldale Ave., Los Angeles 37, Calif.

**HAVE YOU READ THE
SERVICE POINTERS
SUBMITTED BY READERS OF THIS JOURNAL?**

IN this department you will find many ideas designed to help you in these days of material shortages.

Help us to maintain this mutual exchange of ideas!

If you have not already done so, we suggest that you read the Service Pointers in this issue. Then sit down and let us have your own ideas. Address "Service Pointers"

The REFRIGERATION SERVICE ENGINEER
433 N. Weller Ave. Chicago

R.S.E. BINDERS

OUR supply of binders for THE REFRIGERATION SERVICE ENGINEER having become exhausted, we find in trying to reorder that the manufacture of these binders has been barred for the duration, owing to the critical material shortage. We regret that until victory comes, orders from our subscribers for these binders cannot be filled.

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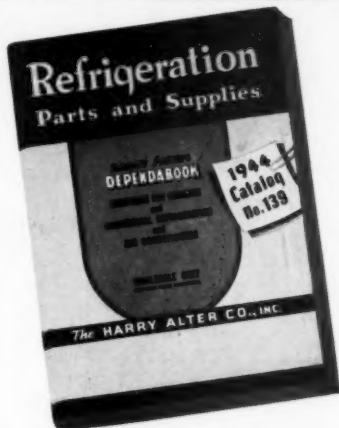
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